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DEPARTMENT OF THE ARMY FIELD MANUAL

ARMORED DIVISION ENGINEER BATTALION

HEADQUARTERS, DEPARTMENT OF THE ARMY

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DEPARTMENT OF THE ARMY
WASHINGTON 25, D.C., *5 April 1961*

ARMORED DIVISION ENGINEER BATTALION

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***This manual supersedes FM 5-134, 5 May 1958.**

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CHAPTER 1
INTRODUCTION

Section I. PURPOSE AND SCOPE OF MANUAL

1. Purpose

a. This manual is a guide for the battalion commander, company commanders, platoon sergeants, platoon leaders, and squad leaders in the organization and operations of the armored division engineer battalion and its component units.

b. It also contains information for the commander and staff officers of the armored division on the tactical employment of the armored division engineers.

c. Users of this manual are encouraged to submit recommended changes or comments to improve the manual. Comments should be keyed to the specific page, paragraph, and line of the text in which change is recommended. Reasons should be provided for each comment to insure understanding and complete evaluation. Comments should be forwarded direct to Commandant, USA Engineer School, Fort Belvoir, Va.

2. Scope

a. The manual covers the organization, missions, capabilities, training, employment, and operations of the armored division engineer battalion and its components.

b. It discusses the employment of major items of equipment of the battalion.

c. Duties of the battalion commander and his staff are discussed in the manual. Duties of other personnel are not discussed unless they vary from the duties listed in SR 605–105–5, for officers, and AR 611–201, for enlisted men.

d. The discussions of missions, organization, personnel, and equipment are based on the latest issues of tables of organization and equipment (TOE's) at the time the manual was written. All references to TOE's list the basic numbers. Department of the Army Pamphlet 310–7 should be consulted for latest suffixes to the basic numbers.

e. The material presented herein is applicable, without modification, to nuclear and nonnulcear warfare.

Section II.
ROLES OF THE ARMORED DIVISION

3. Operations

a. The armored division is capable of employment in any situation from a show of force to total nuclear war under all conditions of ground combat.

b. The role of the armored division in war is to serve as the basic large armored unit of the combined arms in mobile operations which are aimed at destroying the enemy.

c. During periods of serious tension and deteriorating international political relationships, the armored division may be employed in operations which are in the national interest but which are short of open hostilities against organized military forces. Examples of such operations include show of force, enforcement of truce

conditions, international police action, and occupation duty. In the conduct of these operations, the armored division usually operates as an element of a larger United States joint force or as an element of a combined Allied force.

4. Organization

The armored division is organized under TOE 17 as shown in figure 1.

5. Characteristics

The armored division is characterized by—

a. A high degree of tactical mobility on roads or cross country because all elements are mounted in track-laying vehicles, wheeled vehicles, or army aircraft.

b. An integrated weapons system of armor-protected, large-caliber tank guns, machineguns, and mortars.

c. Inherent protection afforded by the armor, which enables it to advance through fire-swept areas or areas contaminated with radiological agents or radiation from nuclear explosions.

d. Immediately responsive, mobile, nuclear delivery means.

e. Light and medium nonnuclear artillery, with on-carriage ammunition and crew transport.

f. An extensive and versatile communication system.

6. Missions

The missions assigned to the armored division are those which capitalize upon its characteristics of speed, mobility, shock action, and firepower. It is particularly well suited to execute missions of the following types:

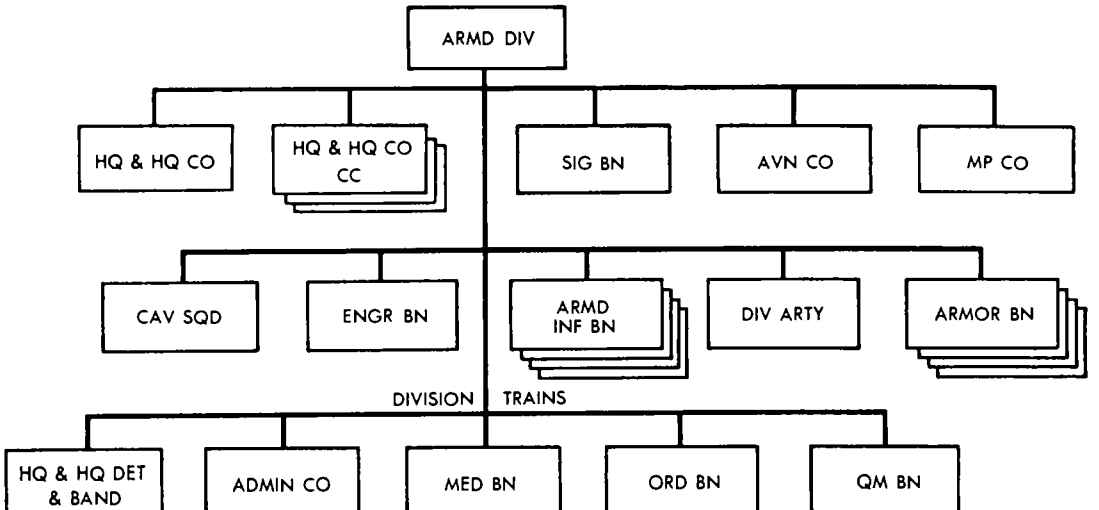


Figure 1. Organization chart, armored division.

a. Offensive operations designed to achieve deep penetration or wide envelopment to seize decisive objectives, destroy hostile forces, and disrupt the enemy rear areas.

b. Exploitation of the successes of other units and of the effects of nuclear fires, as a decisive element of a larger force.

c. Pursuit of enemy forces.

d. Covering force for a higher command conducting offensive or defensive operations.

e. Striking force of a higher command on the defense or conducting a mobile defense.

f. In conjunction with any of the above, the destruction of enemy armored formations.

g. Special operations, such as offensive action against enemy airborne or guerrilla forces, and operations in conjunction with airborne and amphibious operations.

h. Operational reserve of the field army or higher command.

7. Organization for Combat

The armored division has no fixed combat command organization. The attachment of the combat, combat support, and service elements of the division to appropriate control headquarters must be accomplished prior to engaging in combat. Five major tactical groupings are usually employed—division troops, division trains, and the three combat commands. Additional tactical groupings may be organized when suitable control headquarters are attached to the division (FM 17–100).

8. Combat Command

a. The armored division is organized to provide maximum flexibility by the formation of combined arms

task forces and teams. This flexibility is reflected in the combat command separate battalion organization. The combat command is a tactical headquarters directly under the division commander. It has no organic troops other than the personnel organic to the combat command headquarters and headquarters company. Combat, combat support, and service support elements of the division are attached to, or placed in support of, the combat for each operation. Each battalion of the armored division is a self-contained unit with organic tactical and essential administrative elements. When combat and combat support elements are combined under the combat command, supported by appropriate service support elements of the division, the combat command becomes a powerful combat element capable of independent action. In nuclear warfare, a major consideration in armored division organization for combat is that each combat command be so organized that its own combat power and logistical self-sufficiency are as independent as practicable of the other elements of the division.

b. The armored division commander decides what grouping of units within each combat command will best accomplish the division mission. Engineer support is furnished in compliance with the division commander's estimate of the situation.

c. Within the combat command, the units usually are organized into combined arms teams consisting of armor and armored infantry, supported by artillery and engineers. These combined arms teams operate under the combat command commander and are called battalion task forces.

9. Task Force

a. There is no definite rule to determine the size and composition of a battalion task force. The commander of the combat command attaches, or places in support, units of the proper type and number to carry out the assigned missions. The composition of the task force can be changed quickly to meet varying tactical situations.

b. A battalion task force organized around a battalion headquarters may be armored-infantry-heavy, tank-heavy, or balanced. A battalion task force is balanced when it contains armored rifle companies and tank companies in equal number, armored-infantry-heavy when it contains more armored rifle companies than tank companies, and tank-heavy when it contains more tank companies. Within the battalion task force, the commander of the combat command organizes company teams.

10. Company Team

A company team is a tactical grouping of units under one company commander formed for a specific operation or mission. The company team consists of a complete company with one or more nonorganic units attached, or a company minus one or more organic units with one or more nonorganic units attached.

CHAPTER 2
ORGANIZATION AND EQUIPMENT

Section I.
ARMORED DIVISION ENGINEER BATTALION

11. Organization

The armored division engineer battalion is organized under TOE 5–5 into a headquarters and headquarters company, four identical engineer companies, and a bridge company (fig. 2).

12. Mission and Capabilities

The armored division engineer battalion has the mission and the capability of providing the following engineer support to the division:

a. Engineer staff planning and supervision for organic and attached engineer troops.

b. Construction, repair, and maintenance of roads, bridges, fords, and culverts.

c. Support of hasty stream-crossing operations with boats, rafts, and bridges and coordination of organic and attached engineer troops in support of deliberate stream crossings.

d. Fixed bridging for passage of short gaps.

e. Assistance in removing obstacles, including mines and boobytraps.

f. Assistance in emplacing obstacles, including mines and boobytraps.

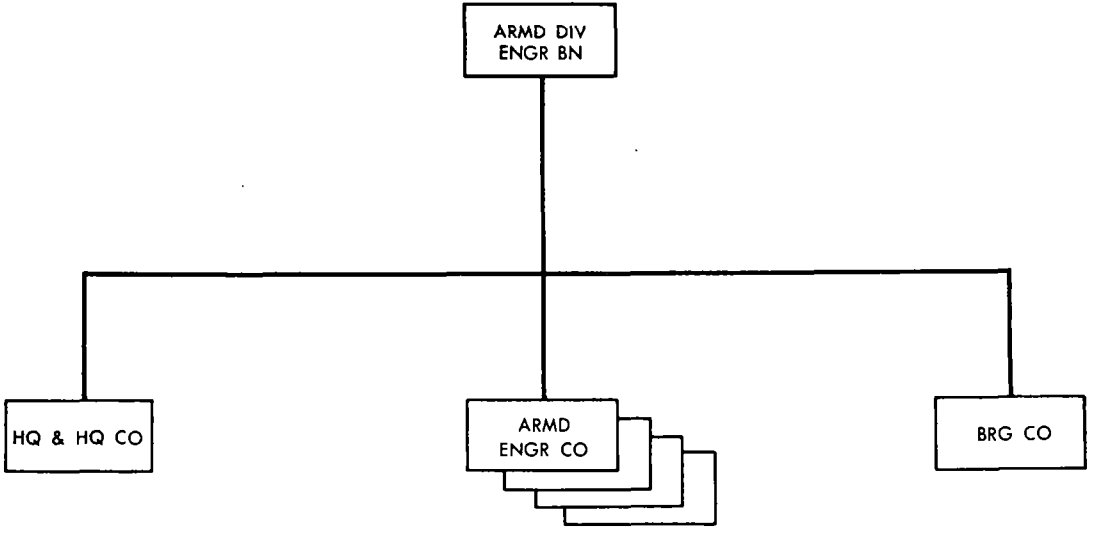


Figure 2. Organization chart, armored division engineer battalion.

g. Preparation and execution of demolitions. This includes employment of atomic demolition munitions (ADM).

h. Assistance to other troops in preparing fortifications and camouflage.

i. Engineer reconnaissance and intelligence.

j. General construction, including construction of air-landing facilities.

k. Construction and placement of deceptive devices.

l. Engineer class II and class IV supplies.

m. Organizational maintenance repair service for equipment organic to the battalion and engineer third echelon maintenance and engineer repair parts supply support for all engineer equipment organic to the armored division.

n. Water purification and supply.

o. Map supply.

p. Technical advice to supported units on engineering matters, including recommendations for employment of engineer troops.

q. Assistance in assault on fortified positions.

r. Exploitation of locally available sources of materials for construction, fortifications, and camouflage.

s. Preparation of traffic signs for routes and bridges.

t. Construction and preparation of defensive works specifically assigned.

u. Assisting other troops in damage control.

v. Engaging in armored infantry type combat missions when required.

13. Combat Readiness

The armored division engineer battalion and its subordinate units may be expected to frequently encounter situations which will involve them in combat

with the enemy's forces, including his guerrillas. Quite apart from possible commitment as armored infantry, and to a greater degree than most other engineer units, personnel of the armored division engineer battalion must at all times be ready for involvement in surprise engagements with the enemy. Further guidelines on this subject are furnished in chapters 3 and 4.

14. Equipment

The armored division engineer battalion contains the weapons, construction equipment, handtools, powertools, bridging, and other specialized equipment that will enable it to accomplish day-to-day engineer missions in support of the armored division. In situations where the battalion lacks the means to provide the engineer support required by the division, the next higher command echelon must provide additional equipment or additional engineer units to accomplish the mission. The applicable TOE's should be consulted to determine the amount and types of equipment authorized in the various units of the battalion. Frequently, a theater commander or other major commander authorizes additions to the organization under his command or deletions from it; therefore, the equipment may vary from command to command. The battalion contains the following major items of equipment, as listed in TOE 5–5:

a. Armored vehicle launched bridges (AVLB) and launchers.

b. Assault boats.

c. Carpenter and pioneer tool kits.

d. Chain saws.

e. Combat engineer vehicles.

f. Contact maintenance vehicles.

g. Crane shovels.
h. Demolition equipment sets.
i. Five-ton dump trucks.
j. Five-ton truck tractors.
k. Five-ton wreckers.
l. Floating bridges and floating bridge erection sets.
m. Medium tractors with angledozers.
n. Mine detectors.
o. Minefield marking sets.
p. Mine scoops.
q. Personnel carriers (fig. 3).
r. Pneumatic tool and compressor outfits.
s. Powerboats.
t. Road grader.
u. Scoop loaders.
v. Tank recovery vehicles
w. Twenty-five-ton, low-bed semitrailers.
x. Water purification sets.

Figure 3. Armored personnel carrier with 1½-ton trailer.

15. Employment

a. The armored division engineer battalion is a self-contained unit designed to provide the best combination of equipment and individual skills for forward area field engineering tasks which assist armor units. It is organized to emphasize pioneer support of armor engaged in combat. Its squads are mounted in armored personnel carriers; and each platoon has a combat engineer vehicle.

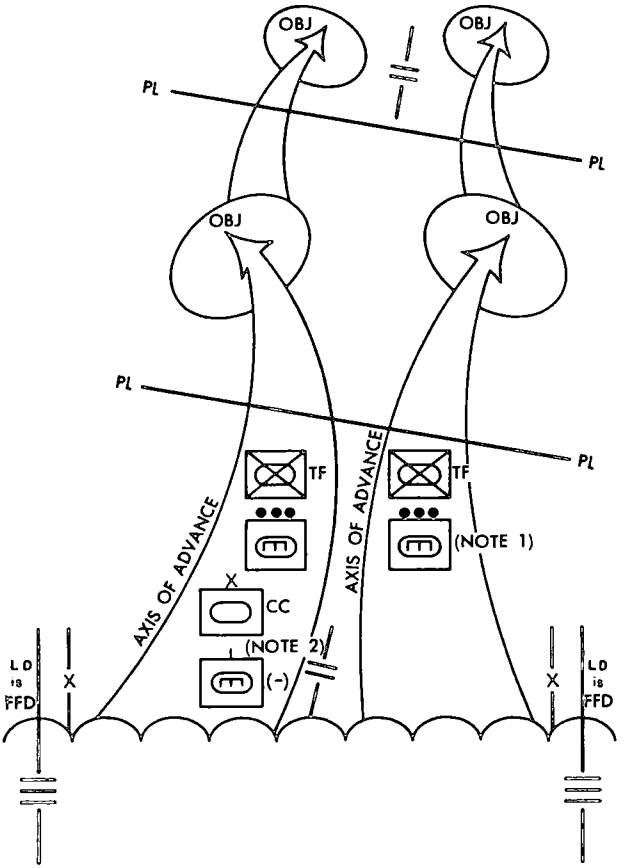
b. Some of the tasks listed in paragraph 12 are performed by the armored division engineer battalion operating under the centralized control of the battalion commander; but most of them are performed by the subordinate units of the battalion that are attached to, or placed in support of, the combat commands and battalion task forces.

c. Those elements of the engineer battalion that are not attached to, or placed in support of, subordinate commands of the division are available for general support missions.

d. The battalion has great flexibility and may be organized to provide support in accordance with the requirements of the situation. One armored engineer company is usually the nucleus to support a combat command. The company may be reinforced with an AVLB section and a water supply team. Additional bridging and equipment are provided as required (fig. 4).

16. Communications

a. Radio. Radio, because of its speed, flexibility, and mobility, is the primary means of communication in the armored division engineer battalion. The battalion headquarters provides radio equipment



OBJ — OBJECTIVE.
PL — PHASE LINE.

LD IS FFD — LINE OF DEPARTURE IS ALSO FRIENDLY FORWARD DISPOSITION.

NOTE 1: Engineer support to leading tosk forces.

NOTE 2: Engineer compony (—) ovailable to support bolonce of CC or reinforce leoding elements if required.

Figure 4. Typical disposition of engineer company in support of a combat command attacking through an infantry battle group zone.

operators and transportation for stations to operate in the division command net RATT (radioteletypewriter), the division logistical net RATT, and the armored division engineer battalion net. The AM radio, which provides voice and continuous wave operation, is employed for extended ranges. It is backed up by the shorter range FM radio (fig. 5).

(1) *Division nets.* Communication to division headquarters is accomplished from battalion headquarters on three radioteletypewriter nets—the division command net, logistical net, and intelligence net. The battalion headquarters is usually located near division main. Therefore, FM radio contact is possible in the division command net FM by the battalion commander and the battalion operations section. However, the operations section enters the FM command net only if the commander is not present or available. The armored engineer battalion maintains a receiver in the division warning broadcast net AM. Each armored engineer company also maintains a receiver in this net.

(2) *Engineer battalion command net AM.* Internal communication for the armored division engineer battalion is provided by the battalion command net AM for maintaining contact between elements of the battalion over the extended ranges expected during normal operations. Command traffic, intelligence traffic, and logistical traffic are carried on this AM net, which constitutes the primary communication system for the battalion, by voice or continuous wave (CW) as required.

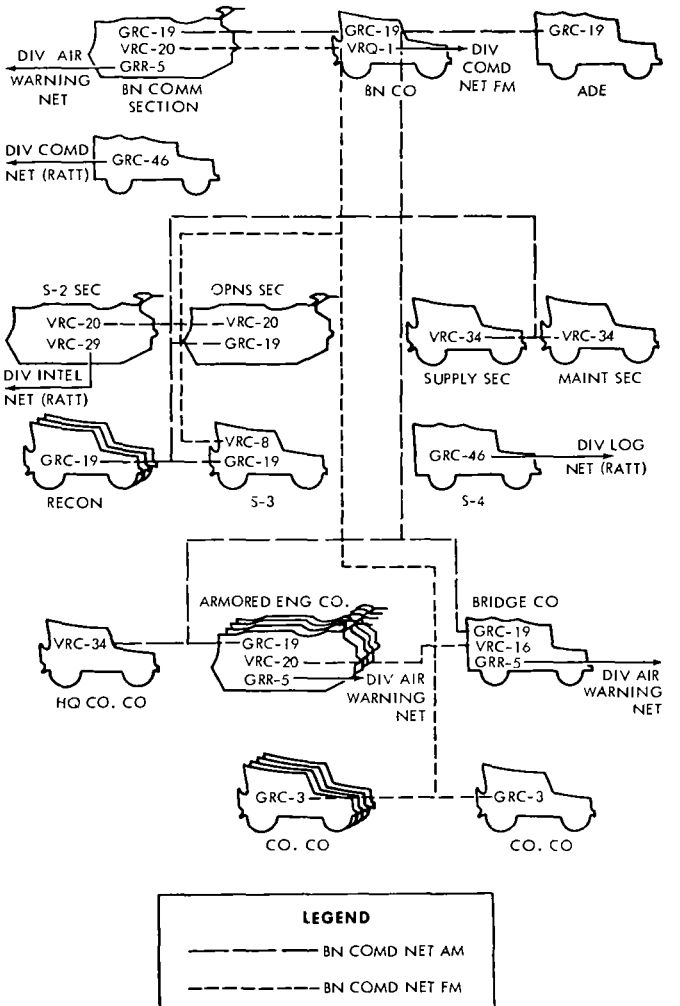


Figure 5. Radio nets (AM and FM), armored division engineer battalion.

Members of the battalion headquarters who need to maintain contact with subordinate elements are provided AM radios. The assistant division engineer, at the division command post, is provided an AM radio.

(3) *Engineer battalion command net FM.* This FM net is primarily for the use of the battalion commander. When its range permits, it reduces the traffic on the AM command net and provides the commander with a voice link with each of the companies.

b. Wire. The widely dispersed operations of an armored division engineer battalion preclude extensive use of organic wire for communication between elements of the battalion other than through the use of the division area communication system (FM 24–18, FM 24–20, and FM 17–70). As the situation permits, wire equipment is used for internal communication in the battalion headquarters (fig. 6) as necessary for specific engineer projects, with both sound-power and battery-power telephones.

c. Sound and Visual Signals and Messengers.

(1) Sound and visual signals and messengers are alternate and supplemental methods of communication. They are used whenever the situation warrants; and they may be the only means available when radio listening silence is imposed, or when wire communication has been disrupted.

(2) Messengers are not authorized in the armored division engineer battalion TOE; but selected personnel, such as vehicle operators, are cross-trained as messengers as an additional duty.

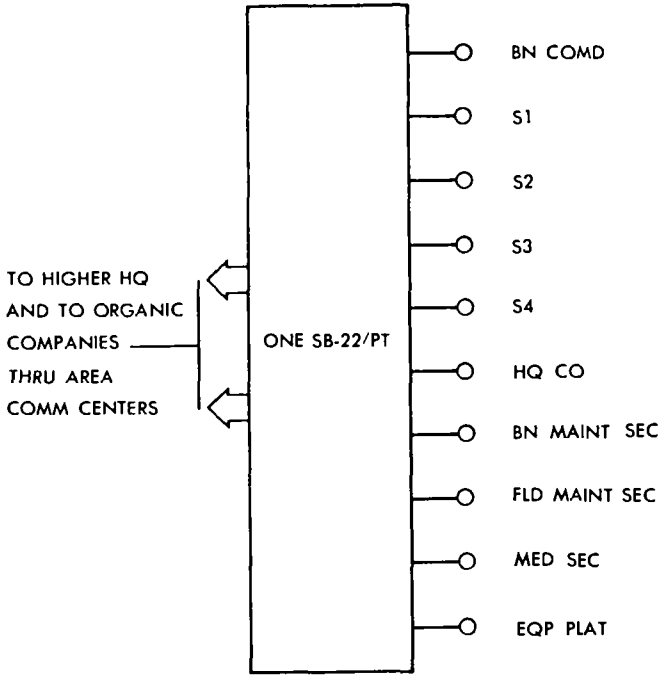


Figure 6. Typical wire net, armored division engineer battalion.

d. Battalion Communication Section.

(1) *Personnel.* The battalion communication section consists of a communication chief, radio operators, radio mechanics, and message center personnel, plus equipment required to support normal engineer operations. The communication officer is assigned to the battalion staff.

(2) *Operations.* The battalion communication section installs and operates the communica-

tion system in the command headquarters and, when necessary, it installs and operates the communication system to subordinate elements. It operates and maintains radios in the unit headquarters elements and provides message center services, including messengers, encoding and decoding messages, and maintenance of communication files, records, and reports. A personnel carrier is provided for operation of the battalion message center and as net control station for both of the battalion command nets. An RATT radio mounted in a ¾-ton truck provides a station in the division command RATT net, while the assigned ¼-ton truck is used for wire operations, maintenance, and message center operations.

e. Special Communication Situations. Nondivisional engineer combat groups and army engineer battalions employ standard AM radios for their primary means of radio communication. They also have vehicular-mounted FM radios. AM radio nets are the primary means for radio communication among engineer units in the division area. Prior planning for frequencies, nets, and call signs is necessary. FM radios may be used where shorter range communication is required. In addition to organic radios, the supported or supporting organization may draw portable armor and common band radios, as required, from the signal depot.

f. Maintenance of Communication Equipment.

(1) The engineer units to which the communication equipment is organic perform operator and organizational maintenance on the equipment.

(2) The division signal battalion performs field maintenance for engineer signal equipment.
(3) When elements of the armored engineer company or bridge company are in support of other organizations, the supported organization may provide limited organizational maintenance support.

17. Mobility

The armored division engineer battalion is 100 percent mobile with organic transportation.

Section II. BATTALION HEADQUARTERS

18. Organization

The engineer battalion headquarters is organized from the personnel and equipment authorized for that purpose in the headquarters and headquarters company. TOE 5–6 authorizes equipment and personnel necessary to provide for a battalion command section, a division engineer section, a unit staff, and a special staff. Figure 7 shows how the battalion headquarters may be organized for operation in one echelon.

19. Mission and Capabilities

The battalion headquarters has the mission and the capability of—

a. Performing engineer staff planning for organic and attached engineer troops and supervising these troops.

b. Giving technical advice on engineering matters to supported organizations.

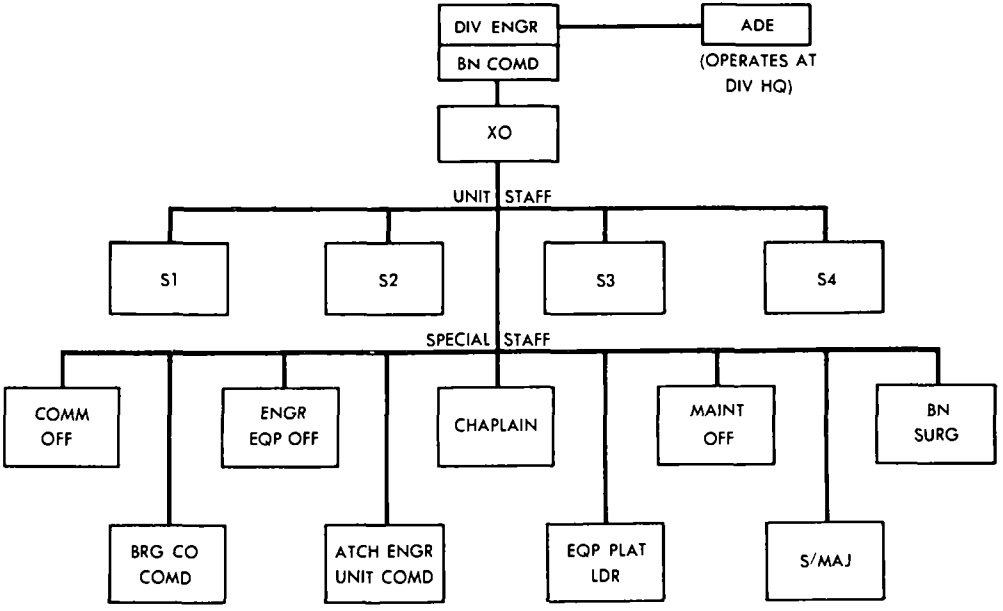


Figure 7. Organization of battalion headquarters for operation in one echelon.

c. Procuring maps and distributing them to the division.

d. Conducting engineer reconnaissance, including special ADM reconnaissance, and intelligence for the division.

e. Furnishing engineer class II and class IV supplies to the division.

f. Furnishing organizational maintenance and repair service for equipment organic to the battalion.

g. Furnishing engineer third echelon maintenance and engineer repair parts supply support for all engineer equiqment organic to the armored division.

h. Providing potable water for the division.

20. Responsibilities of Commander and Staff

a. Dual Capacity of Commander. The battalion commander has two separate responsibilities. He is the division engineer on the division special staff; and he is the commanding officer of the armored division engineer battalion. He must organize his staff (fig. 8) so that its members can help him carry out both responsibilities.

(1) As battalion commander, he—

(*a*) Directs, controls, and supervises the activities of all organic and attached engineer troops and their equipment in the performance of the battalion mission to provide combat support as enumerated in paragraph 12.

(*b*) Is responsible for the preparation of battalion policies, plans, and orders, including the battalion standing operating procedure (SOP).

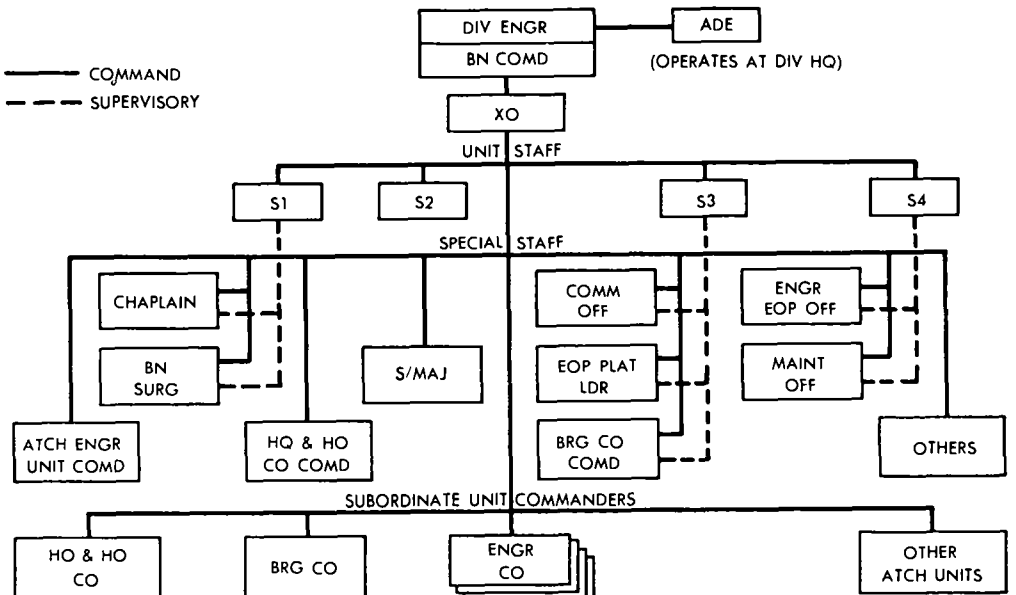


Figure 8. Command and staff relationship.

(*c*) Visits and inspects his troops and supervises their activities.

(*d*) Makes personal reconnaissance.

(*e*) Directs liaison activities of battalion personnel and performs personal liaison as required.

(2) As division engineer (special staff), he—

(*a*) Advises the commander and staff on engineer matters.

(*b*) Prepares appropriate annexes to division operations and administrative orders.

(*c*) Makes plans and recommendations pertaining to requirements for, and employment of, engineer troops.

(*d*) Provides engineer staff planning and supervision for organic and attached engineer troops.

(*e*) Supervises the determination of requirements for, and the requisitioning, procurement, storage, distribution, and documentation of, engineer equipment and supplies.

(*f*) Assists in barrier and denial operations. This assistance includes advising the operations officer concerning implementation; supervising the technical aspects of employment; preparing plans and orders; and, as appropriate, assisting in the location and construction of obstacles (including atomic demolition munitions) which require special skills and equipment.

(*g*) Supervises the engineer operations pertaining to classification of roads and bridges, the preparation and posting of permanent signs for route marking and traffic control

on temporary and permanent routes; and the issue of materials to military police units for preparing and posting temporary signs on temporary and permanent routes.

(*h*) Makes recommendations for the preparation of fortifications and camouflage.

(*i*) Prepares plans for construction and placement of deceptive devices.

(*j*) Makes recommendations on river-crossing operations.

(*k*) Makes recommendations on provision of maps to the division, and, with G2, plans for map supply.

(*l*) Is responsible for collecting, evaluating, and disseminating information on enemy engineer materiel and activities.

(*m*) Is responsible for engineer reconnaissance and for preparing terrain analyses; and he advises the division commander on the effects of the terrain on division operations.

(*n*) Supervises, within the limits prescribed by the division commander, engineer and camouflage activities of divisional units.

(*o*) Designates the emplacing and firing unit when the division commander has decided to employ ADM; coordinates on supply; and coordinates on moving equipment, materials, and personnel to support the mission. He furnishes the commander technical information on the quantity, type, and yield of weapons; height or depth of burst; emplacement site; on-call detonation or time of burst; troop and safety pre-

cautions; special equipment needed; and anticipated results.

b. Assistant Division Engineer (ADE). As the principal engineer representative at the division command post, the assistant division engineer relieves the division engineer of many of his routine duties at division headquarters. In accordance with the policies of the division engineer, the ADE—

(1) Advises the division commander and division staff on engineer matters.
(2) Maintains communication and liaison with the engineer battalion, corps engineer section, and army engineer section and insures timely flow of engineer information.
(3) Keeps the division engineer informed on division staff actions and planning responsibilities.
(4) In conjunction with the battalion S2, S3, and S4, prepares engineer annexes and portions of the division operations and administrative orders and plans.
(5) Keeps the engineer situation map up to date.

c. Unit Staff.

(1) *Executive officer.* The executive officer is normally second in command. In accordance with the policies of the battalion commander, he—
   (*a*) Assists the commander in exercising his command functions.
   (*b*) Supervises the activities of the battalion staff.
   (*c*) Controls and coordinates battalion field operations.

(2) *Adjutant (S1).* The adjutant handles the battalion personnel and administrative matters. Specifically, he—

(*a*) Keeps records on the classification, assignment, pay, promotion, transfer, retirement, and discharge of personnel.

(*b*) Processes awards of decorations, citations, commendations, and other honors.

(*c*) Processes applications for leave.

(*d*) Keeps records of military justice procedures.

(*e*) Maintains reports of strength, casualties, prisoners of war, and other personnel statistics.

(*f*) Makes arrangements for receiving, processing, assigning, and quartering replacements.

(*g*) Lays out the command post and establishes routine procedures affecting its operation.

(*h*) Makes recommendations on the shelter, command, and administration of quartering areas.

(*i*) Obtains funds for morale-building activities.

(*j*) Operates the battalion postal service.

(*k*) Supervises the collection and evacuation of prisoners of war.

(*l*) Maintains the battalion journal.

(3) *Intelligence officer (S2).* The intelligence officer directs the activities of the intelligence section and furnishes the battalion commander detailed information on which to base his advice to the division commander. He—

(*a*) Collects, evaluates, and disseminates engineer information.

(*b*) Keeps the S2 situation and radiological maps and the S2 journal.

(*c*) Trains others in intelligence work.

(*d*) Procures and distributes maps, in coordination with G2.

(*e*) Operates, with the assistance of three reconnaissance officers, continual reconnaissance throughout the division sector during combat operations.

(*f*) Prepares, in conjunction with the S3, engineer recommendations for division main supply routes (MSR's), routes, and traffic circulation.

(4) *Operations officer* (*S3*). As supervisor of the operations section, the operations officer—

(*a*) Plans battalion training and assists in its supervision.

(*b*) Allocates engineer troops and construction equipment to various tasks.

(*c*) Prepares battalion operations orders.

(*d*) Arranges details for movement of the battalion under tactical conditions.

(*e*) Prepares plans for accomplishing engineer tasks.

(*f*) Recommends security measures for battalion headquarters.

(*g*) Keeps the engineer operations situation map.

(*h*) Prepares tactical and technical reports as the battalion commander directs.

(*i*) Assists the division staff in nuclear target analysis and selection.

(5) *Supply officer* (*S4*). The S4 is the division engineer supply officer as well as the battalion

supply officer. In directing the activities of the supply section, he must coordinate with S2, S3, G4, subordinate commanders, and supply installations. The S4—

(*a*) Effects pickup at army depots or army supply points and issues to units of the division the engineer class II and class IV items required except fortification and construction materials.

(*b*) Coordinates and supervises the supply of fortification and construction materials for the division.

(*c*) Supervises procurement of all classes of supplies for the battalion.

(*d*) In cooperation with S2, studies and collects information on the general supply situation, including data on local resources.

(*e*) Supervises water supply to the division.

(*f*) Coordinates activities of engineer maintenance and supply.

(*g*) Recommends allocation of nonorganic transportation within the battalion.

d. Special Staff.

(1) *Communication officer.* The communication officer supervises the communication section; and, as staff officer, he supervises all communication activities within the battalion. He also—

(*a*) Supervises the organizational maintenance of all signal equipment in the battalion.

(*b*) Advises the battalion commander on signal communication techniques.

(*c*) Makes plans and recommendations for the engineer communication system and

establishes, operates, and maintains the system.

(*d*) Supervises technical training of communication personnel in the battalion and supervises and instructs communication center personnel in the functions of a message center.

(*e*) Gives technical assistance to S4 on supply of signal communication materials for the battalion.

(*f*) Makes recommendations for the initial and successive locations of the battalion command post (CP) if the locations are not prescribed by higher authority.

(2) *Maintenance officer.* The maintenance officer is the supervisor of the battalion maintenance section. He—

(*a*) Advises the battalion commander, the staff, and the company commander on the technical aspects of motor vehicle operation and maintenance.

(*b*) In coordination with S3, directs training for battalion drivers, operators, and mechanics.

(3) *Engineer equipment officer.* The engineer equipment officer—

(*a*) Controls third echelon engineer maintenance activities in the division.

(*b*) Supervises the training, operation, and supply activities of the engineer field maintenance section of the battalion.

(*c*) Advises the commanders of divisional units and their staffs on the technical aspects of engineer equipment maintenance and operation and on training equipment operators.

(4) *Chaplain.* The chaplain is adviser to the battalion commander and staff on all matters pertaining to religion, welfare, and morale in the command. He—

(*a*) Conducts religious services, including funerals.

(*b*) Corresponds with relatives of deceased personnel.

(*c*) Coordinates the religious work of various welfare societies.

(*d*) Prepares reports on religion and morale activities of the command.

(*e*) Prepares estimates of funds for religious activities which are not specifically charged to other agencies of the command.

(5) *Battalion surgeon.* The battalion surgeon supervises the medical services of the battalion He serves as adviser to the battalion commander and staff on matters affecting the health of the command and the sanitation of the battalion area. In addition to his special staff duties, he directs the activities of the battalion medical detachment. Specifically, the battalion surgeon—

(*a*) Instructs battalion personnel in personal hygiene, military sanitation (FM 21–10), and first aid.

(*b*) Makes medical and sanitary inspections, including inspections of water points.

(*c*) Establishes and operates the battalion first-aid station and dispensary.

(*d*) Requisitions medical equipment and supplies for the battalion.

(*e*) Prepares the battalion medical plan.

(*f*) Supervises the collection and evacuation of wounded, the maintenance of radiological exposure records, the preparation of casualty lists, and the preparation of other records pertaining to the medical service.

e. Other Special Staff Officers. Other officers may have special staff responsibilities in that they advise the commander on matters related to the employment of their units.

(1) *Bridge company commander.* The bridge company commander advises the battalion commander on the proper utilization, capabilities, and limitations of floating equipment.

(2) *Equipment platoon leader.* The equipment platoon leader advises the commander on the utilization of his equipment.

(3) *Liaison officers and commanders of attached units.* The liaison officers and commanders of attached units advise the battalion commander on the capabilities of their units.

(4) *Sergeant major.* The sergeant major is the senior noncommissioned officer assigned the armored division engineer battalion. He functions under the direction of the battalion commander. He exercises no command prerogative except in the event all commissioned officers are absent. However, he is expected to make on-the-spot corrections and decisions; and he utilizes a direct channel to all unit first sergeants and staff section sergeants within the battalion. Specifically, the sergeant major inspects the security of the battalion headquarters and area. He evaluates and makes recommendations on the

overall discipline of the battalion. with emphasis on the conduct and discipline of the noncommissioned officers. He actively assists in the investigation of any changes involving noncommissioned officers; and he functions as a member of any board pertaining to noncommissioned officers. The sergeant major monitors all battalion formations and drill periods and commands all battalion honor guards. He instructs noncommissioned officers in their duties; and he orients all incoming personnel (officer, noncommissioned officer, and enlisted) in the history and traditions of the battalion. He supervises the unit noncommissioned officers' mess and should be a member of the unit fund and character guidance councils.

21. Operation

The battalion commander organizes and locates his headquarters in a manner best suited for carrying out his staff and command functions.

a. Location. In addition to other considerations, the headquarters is located to facilitate communication with the main division command post, subordinate units, the division trains, and other supporting engineer units. Frequently, the situation or the disposition of the division will dictate the organization and operation of the headquarters in one, two, or three echelons. Fragmentation of the headquarters to the extent that effective operation is impaired must be avoided.

b. Echelons.

(1) Figure 7 illustrates how the headquarters may be organized to operate from one location (par. 18).

(2) Figures 9 and 10 illustrate the organization and location of the headquarters for operation in two and three echelons. The battalion commander may organize his headquarters into two echelons when frequent moves are anticipated, for reasons of dispersion, to improve communications and control, or to stay in close touch with an operation such as a river crossing. In any of these situations, the commander keeps in the forward echelon the staff officers and other personnel he needs to assist him in fulfilling his command and staff responsibilities. In a fast-moving situation, the battalion commander may be operating with the division commander and his command group. In such a situation, the division engineer cannot keep the entire headquarters with him; so he organizes it into three echelons.

c. Layout. The battalion headquarters or command post (CP) is laid out to facilitate security, dispersion, concealment, movement to and from the area, and movement within the area. Figure 11 illustrates a command post layout when the CP is in one echelon. The assistant division engineer (ADE) is located at the division main command post. The engineer field maintenance section and the engineer equipment maintenance officer are located in the division trains area.

22. Administration

When the armored division is not committed to combat, normal administrative procedures apply in the operation of the armored division engineer battalion

ENGR BN, FORWARD	ENGR BN, REAR
BN COMD BN XO ADE (AT DIV MAIN CP) S2 S3 COMM OFF BN SURG HQ & HQ CO COMD *BRG CO COMD *EQP PLAT LDR	S4 (RESPONSIBLE TO BN COMD FOR OPERATION OF BN, REAR) S1 MAINT OFF ENGR EQP OFF COMM NCO HQ & HQ CO XO

* These personnel remain with these units except when needed at the CP.

NOTE: The battalion forward command post at (CP) is located near the division main CP. The battalion, rear, is in the division trains area. All personnel and equipment which are not required for the operation of the forward echelon are placed with the rear echelon.

Figure 9. Organization of battalion headquarters for operation in two echelons.

ENGR BN COMD GP	ENGR BN, FORWARD	ENGR BN, REAR
BN COMD ADE S2 COMM OFF ASLT BRG PLAT LDR	BN XO S3 S/MAJ COMM NCO HQ & HQ CO XO BRG CO COMD EQP PLAT LDR MAINT OFF BN SURG CHAPLAIN	S4 S1 HQ & HQ CO COMD ENGR EQP OFF

Figure 10. Organization of battalion headquarters for operation in three echelons.

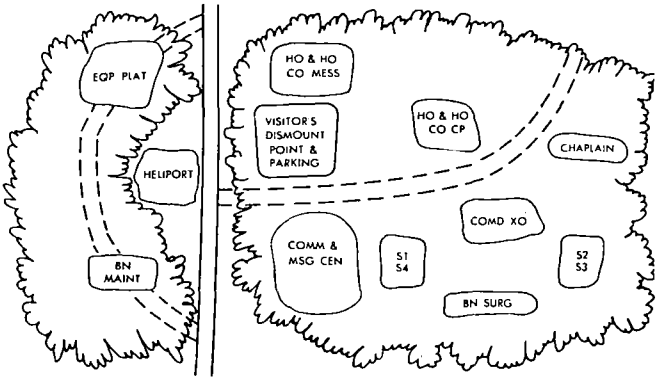


Figure 11. A battalion command post layout—one echelon.

headquarters. When the division is committed to combat, the battalion personnel section is placed under the control of the administration company and under the technical supervision of the adjutant general. Information to the battalion personnel section is relayed to it through the battalion adjutant, except for those units on attached status who relay through the adjutant of the supported organization.

Section III. BATTALION INTELLIGENCE, SUPPLY, MAINTENANCE, AND TRAINING RESPONSIBILITIES

23. Intelligence

The commander of the armored division engineer battalion has three basic intelligence responsibilities—to the armored division, through engineer technical intelligence channels to the corps and army engineer, and to the battalion.

a. Responsibility to Division. The battalion commander, with the assistance of the S2, furnishes timely intelligence information to the division on terrain; minefields and obstacles; effects of weather; effects of nuclear detonation on the terrain; enemy fortifications; enemy engineer troops—their capabilities, equipment, materiel, and techniques; routes of communication; and sources of usable engineer supplies and equipment.

b. Technical Channel Responsibilities. The duties of the battalion commander relative to his technical channel responsibilities are to collect, examine, and report on captured engineer enemy materiel; to coordinate with other services on exploitation of materiel of interest to more than one of the technical services; and to provide, within the engineer field of interest, information to instruct troops on foreign materiel, including recognition, characteristics, use, and interchangeability with United States or Allied equipment.

c. Responsibility to the Battalion. The battalion commander, assisted by the S2, disseminates intelligence information to subordinate and supporting units of the battalion, prepares terrain analyses and studies for use by the battalion, and supervises intelligence training within the battalion.

d. Sources of Engineer Information. The division engineer obtains engineer intelligence information from the following sources:

(1) Aerial and ground reconnaissance agencies.
(2) Aerial and ground photographs.
(3) Maps.
(4) Prisoners of war.
(5) Refugees.
(6) Local civilians.
(7) Captured enemy materiel.

(8) Captured enemy installations.
(9) Captured enemy documents.
(10) Other documents, including texts, periodicals, and technical papers.
(11) Intelligence publications, including terrain and weather studies.

24. Supply Responsibilities

a. Engineer. The supply section of headquarters and headquarters company procures engineer items for the division. This procurement is based on requisitions submitted by supply officers of divisional units. The supply section distributes the supplies directly to the requesting units.

b. Maps. The engineer battalion S2 procures maps and distributes them to the units of the armored division in accordance with general policies of the division G2 and in accordance with estimates made by the division engineer and the G2.

c. Water.

(1) *Water supply teams.* The armored division engineer battalion has five water supply teams, with five water purification sets and enough transportation and water supply specialists and helpers to operate the sets independently in establishing the water supply points required by the division. One team is assigned to each combat command, one is assigned to division trains, and one is kept in reserve. Whether sent to a specific location or attached to an engineer company, the team operates alone. The location of the team determines how it gets its rations. It may be attached to an adjacent unit for

rations; rations may be delivered to it by the armored engineer company or by battalion headquarters company; or the team may prepare its own food on small cooking units.

(2) *Water supply points.* With the water purification sets, the battalion water supply teams establish the water supply points (fig. 12) required by the division; and each unit of the division draws water from the point nearest it. Normally, a team establishes a water supply point in the combat command trains area, but if a suitable water source is not available in the trains area, a water supply point is established at the nearest water source. Water point locations are reported by the attached engineer company commander to the combat command and to the engineer battalion headquarters.

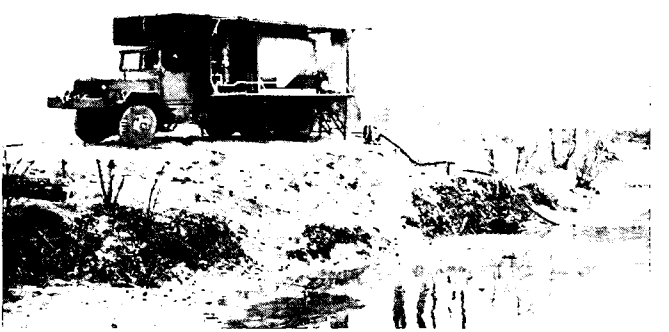


Figure 12. Water point in operation.

(3) *Sources of water.* Water is usually obtained from local sources, using water supply equipment organic to the engineer battalion. When a source of water is not available in the division area, the division engineer has staff responsibility for obtaining water elsewhere and stocking it at division water supply points. In this case, the engineer water supply teams operate water storage and supply points.

(4) *Operation of water supply points.* The tactical situation and the sources of water dictate the location and hours of operation of water supply points. Road nets, parking areas, and concealment are secondary considerations. Normally, units are permitted to draw water any time the water point is in operation. If water supply is limited or the demand excessive, units may be allowed to draw water only at scheduled times. Units should draw water as soon as practicable after the opening of the water point, as the water equipment must be dismantled in time to accompany the unit which it is supporting.

25. Maintenance Responsibilities

To take care of its maintenance responsibilities, the armored division engineer battalion has a battalion maintenance section and a field maintenance section.

a. Battalion Maintenance Section. The battalion maintenance section performs second echelon maintenance on all ordnance and engineer equipment in headquarters company; and it assists in second echelon maintenance for all the companies of the battalion. The section is under the control of the maintenance

officer, who is assisted by a warrant officer. The duties of the maintenance officer are described in paragraph 20. The assistant maintenance officer checks incoming repair work to see if first echelon maintenance has been performed and to determine the amount of repair work needed. He also checks the completed work to be sure that the equipment is in operating condition before it is released from the shop. Another responsibility of the assistant maintenance officer is to give technical help to all company motor pool personnel.

b. Field Maintenance Section. The battalion field maintenance section performs engineer third echelon maintenance on all engineer equipment in the division. It usually does this work at the worksites (fig. 13). Items which are beyond the capabilities of contact repair are evacuated by the using organization to the supporting engineer field maintenance (direct support) company. Items such as small generators and compressors may, at the discretion of the engineer inspector, be evacuated to the battalion field maintenance section for repair and return. However, since the section does not have evacuation equipment and since it must maintain mobility, it should not build up a bigger backlog than it can move with its organic equipment. The battalion field maintenance section is dependent upon the supporting field maintenance company for repair parts. It maintains continuous liaison with division units and with the supporting field maintenance company in order to speed up the evacuation, repair, and return of items from the field maintenance company to division organizations. The battalion field maintenance section is under the control of the engineer equipment officer, who is assisted by the warrant officer and the section chief. The duties of

the engineer equipment officer are discussed in paragraph 20.

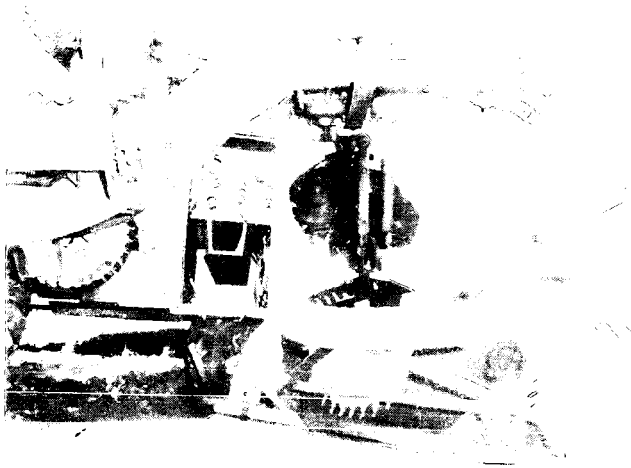


Figure 13. Contact maintenance.

26. Battalion Training

a. Instruction Materials. The following reference materials are essential for effective training in the armored division engineer battalion:

(1) The current issues of TOE's 5–5, 5–6, 5–7, and 5–8.

(2) Army Training Program 5–5.

(3) Field Manuals 5–20, 5–25, 5–26, 5–30, 5–36, 7–10, 7–40, 17–1, 17–20, 17–50, 17–70, 17–100, 21–5, 21–6, 21–10, 21–30, 21–40, 21–41, 21 48, 21–60, 24–18, 24–20, 30–5, 30–10, 30–16, 31–15, and 31–60.

(4) Technical Manuals 5–271, 5–505, 5–4610–204–10, 9–2810, and 21–300.

(5) Training Circular 101–1.
(6) DA Pamphlet 108–1.

b. Responsibility. The commander of the armored division engineer battalion is responsible for all aspects of battalion training, including conduct, efficiency, and results.

c. Objective. The objective of training in the armored division engineer battalion is to develop operating techniques that will enable the battalion to function efficiently when integrated with other units of the armored division in combat. As a general guide, subject to modification imposed by division training directives, training follows the army training programs (ATP's) provided by the Department of the Army. The training is conducted to develop the battalion to perform an anticipated mission in a specified period of time. Battalion training never ceases. It is continuous before battle, during battle, and after battle. From the outset, each member of the battalion must be taught to expect nuclear warfare and to be prepared to function under nuclear conditions. Throughout this training, emphasis should be placed upon rapid movement and efficient communications.

d. Training Time. A general breakdown showing the total time to be devoted to each subject in a 44- or 48-hour week is given in the ATP's. This is the minimum training week. Night operations and field exercises ordinarily require much more time. Other variables which affect training time and methods are—

(1) Specific battalion mission.
(2) Present training status of the battalion.
(3) Personnel situation.
(4) Time available for training.

(5) Weather.
(6) Training areas and facilities.
(7) Status of equipment.

e. Training Phases. The ATP is divided into four phases—basic combat phase; advanced individual phase; unit training phase; and field exercise and maneuver phase. For convenience in planning and to indicate definite stages of progress, the general phases are usually subdivided.

(1) *Basic combat training phase.* The objective of the basic combat training phase is to train the enlisted man in basic military subjects and in the fundamentals of combat.

(2) *Advanced individual phase.* In this phase, the armored division engineer battalion enlisted man learns the technical skills he needs to perform the duties of his TOE position. General training and specialist training are interwoven throughout the advanced individual phase.

(*a*) *General training.* The objectives of general training are to train the enlisted man in engineer and additional military subjects which will enable him to perform the basic duties of an engineer soldier in the armored division engineer battalion.

(*b*) *Specialist training.* Specialist training prepares personnel to perform the duties of their particular MOS's, such as combat construction specialist, map distribution specialist, engineer supply specialist, or water supply specialist.

(3) *Unit training phase.* In this phase, individuals are taught to coordinate their efforts toward

accomplishing the battalion missions. This phase consists of the basic and advanced unit subphases.

(a) *Basic.* In the basic unit subphase, the individually-skilled engineer soldiers are trained to function progressively as members of squads, platoons, and companies.

(b) *Advanced.* During the advanced unit subphase, companies are trained to work together as a battalion; and the battalion is trained to operate with the armored division. Each of the engineer companies trains with an armored division combat command. Elements of the bridge company are employed with the engineer companies. The command, staff, and administrative sections throughout the battalion receive practical and intensive training in their respective fields.

(4) *Field exercise and maneuver phase.* This phase provides for training large units on the ground under simulated combat conditions. These maneuvers include many types of units in order to insure maximum combined arms training. During this phase, the entire battalion works in general support of the armored division.

f. Concurrent Training. To make training more realistic and effective, arbitrary boundaries between training phases must be avoided. Each subject is related to other subjects, and all subjects are integrated into the team mission. This entails, to some degree, conducting basic and advanced individual, specialist, and unit training at the same time. Reviews of basic

subjects are incorporated regularly in the progressive training phases. In many technical exercises, tactical requirements are included, such as providing security for bridge construction projects and protecting working parties and obstacles from ground and air attack. Throughout all phases of training, and particularly during unit training and field exercises, initiative and a sense of responsibility must be developed in officers, noncommissioned officers, and others who show potential leadership. The battalion commander includes leadership exercises in all training phases, particularly during periods of tactical and technical training. Command is decentralized, and interference with subordinate commanders is kept to a minimum. Members of the battalion are instilled with the importance of making decision in situations which are not covered by specific orders. Additional training for staff officers and other key personnel may be received in special schools conducted by battalion or higher headquarters.

g. Tactical Training. Closely tied in to all engineer training is progressive instruction in combat principles, applied particularly in conjunction with security on the march, in assembly areas, and at worksites. Infantry methods and formations, prescribed in FM's 7–10, 7–40, 17–20, and 21–5, should be used as guides; but they must be adapted to engineer strength, armament, and organizations.

Section IV. HEADQUARTERS COMPANY

27. Organization

The headquarters company of the armored division engineer battalion is organized under TOE 5–6. It is

composed (fig. 14) of the company officers and the enlisted men who are assigned to the battalion staff sections, the company headquarters, and the equipment platoon.

28. Mission and Capability

a. The headquarters company has the mission and capability of providing the operating personnel for the various staff sections of the battalion headquarters. The company commander, with the aid of his personnel in the company headquarters, is responsible for the feeding, clothing, conduct, administration, and certain training of the personnel assigned to the company. Personnel assigned to the staff sections of the battalion headquarters work under the control of the respective units and special staff officers who are responsible for training their staff sections.

b. Headquarters company also operates an equipment pool which is located in the equipment platoon (par. 29). The battalion maintenance section performs second echelon maintenance on all ordnance and engineer equipment in headquarters company since neither company headquarters nor the equipment platoon is authorized the personnel to perform these functions.

29. Equipment Platoon

a. Mission. The mission of the equipment platoon is to provide a pool of equipment, with operators, for the use of the bridge company and the engineer companies.

b. Equipment. Equipment in the equipment platoon includes medium tractors with angledozers, truck-mounted crane shovels, a trailer to transport crane

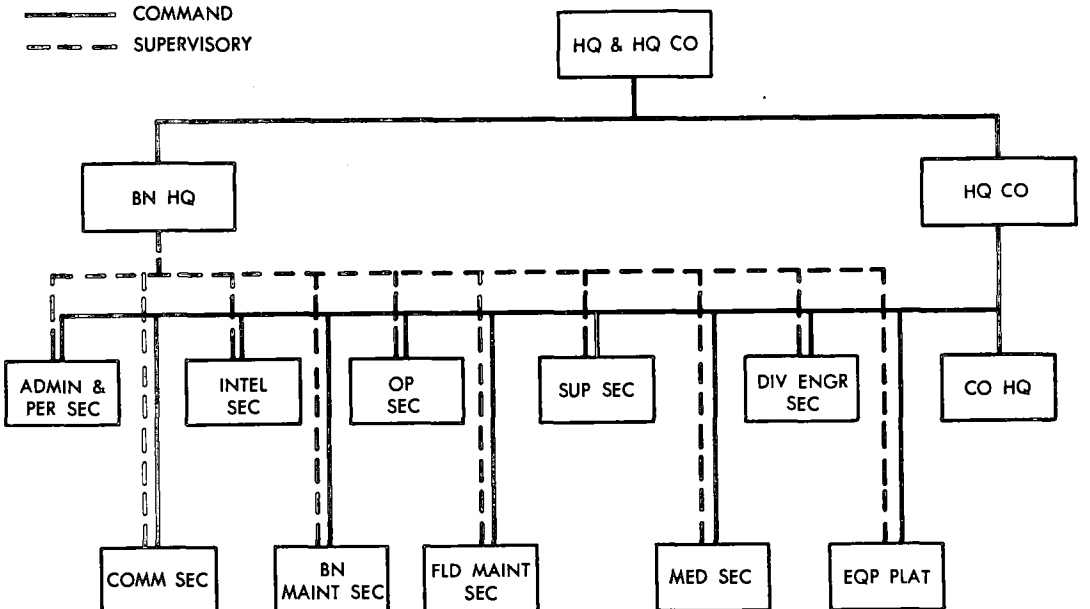


Figure 14. Organization chart, headquarters company.

attachments, a motorized road grader, scoop loaders, and pneumatic tool and compressor outfits. Five-ton truck-tractors, with 25-ton low-bed semitrailers, are provided for transporting the angledozer tractors.

Section V. ARMORED ENGINEER COMPANY

30. Organization

The armored engineer company is an operating component of the armored division engineer battalion and is the basic working unit in the battalion. It is organized under TOE 5–7 into a company headquarters and three identical engineer platoons, each with a platoon headquarters and three identical engineer squads (fig. 15).

31. Mission and Capabilities

a. The armored engineer company is equipped and trained to fulfill its mission of performing general engineer work which facilitates the combat effectiveness of the armored division and contributes to that effectiveness. It may provide engineer support to one typically constituted combat command in a normal situation. It can be readily augmented with personnel or equipment or adjusted to meet the changing situation; and it can carry out armored infantry type combat missions when required. Specifically, the armored engineer company—

(1) Performs combat engineer tasks, including repair and maintenance of roads, bridges, fords, and culverts; and, when augmented with additional engineer heavy equipment, it can execute more complex construction tasks, including roads and air-landing facilities.

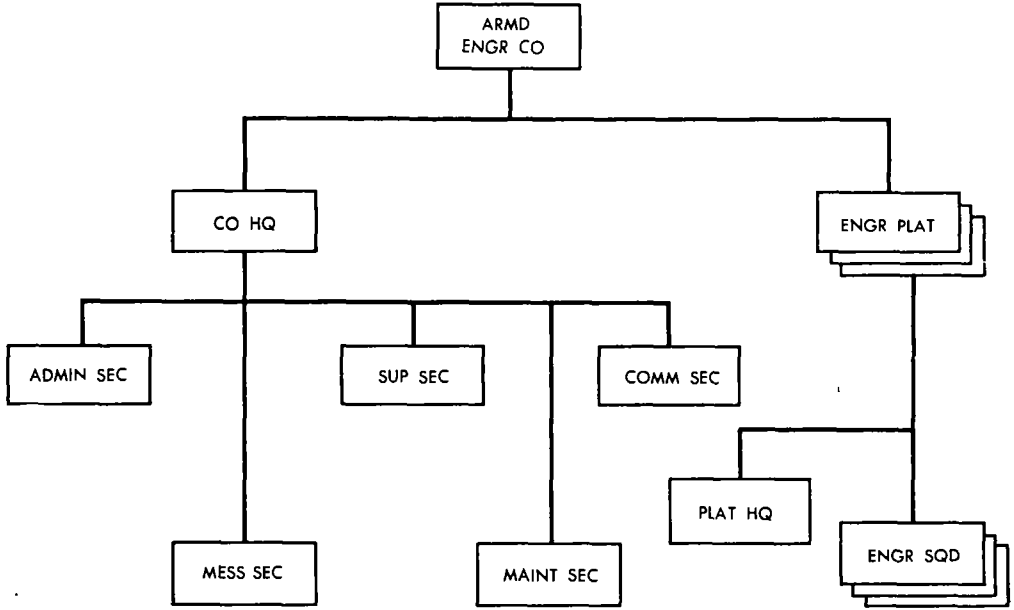


Figure 15. Organization chart, armored engineer company.

(2) Helps other troops emplace and remove obstacles. These obstacles include mines and boobytraps.
(3) Prepares and executes demolitions, including atomic demolition munitions.
(4) Helps other troops construct and emplace fortifications, camouflage, and deceptive devices.
(5) Assists other troops in assaults on fortified positions.

b. The platoon is the main operational component of the armored engineer company. It performs pioneering and combat missions when operating as a major work element of the company. It is also capable of providing the engineer support normally required by a battalion task force when provisions are made to provide equipment support from the parent company or battalion.

c. The squad is the basic operating and working unit of the platoon. It consists of specialists in combat construction and demolition, including pioneers who are trained to assist in accomplishing combat engineer tasks. The squad personnel and organic equipment are mounted in an armored personnel carrier, giving the squad cross-country mobility.

32. Equipment

a. The equipment in company headquarters includes an armored personnel carrier, a five-ton dump truck, a gasoline tanker, a medium tractor with angledozer blade, and a trailer-mounted pneumatic tool and compressor outfit. The equipment in platoon headquarters includes a carpenter tool kit, a chain saw, a demolition equipment set, five-ton dump trucks, an electric pioneer tool outfit, a medium tank with bull-

dozer blade (fig. 16) and a pioneer tool kit. Each squad contains an armored personnel carrier, a carpenter tool kit, a demolition equipment set, a mine detector, and a pioneer tool kit. The squads are also equipped with handtools and light weapons.

b. The company is normally reinforced with AVLB or other bridging and equipment from the bridge company or the headquarters company to tailor its capabilities for particular missions or tasks.

Figure 16. M–48 tank with dozer blade.

33. Training

The company commander plans his training programs in accordance with battalion training directives and policies. He employs two types of training. In one type, the whole company is engaged in the same project; and all the elements of the company learn to work together as a team. This is practical for training in armored infantry type combat and in construction, particularly expedient road and bridge construction and repairs. In the other type of training, the platoons

work on different tasks; and the command, mess, supply, equipment, maintenance, and communication sections learn how to support these work elements. This type of training is practical for any subject which is required in the armored engineer company.

34. Employment

a. Company.

(1) One reinforced armored engineer company may support each committed combat command. In situations where control and communication are difficult, the company may be attached.

(2) The armored engineer company supporting an attacking combat command should be disposed well forward in the tactical column in order that it may be made immediately available for essential engineer tasks. A typical disposition would be the armored engineer platoons, with assault bridging, marching immediately to the rear of the lead company teams. The company minus would be located in the vicinity of the combat command command post (CP).

(3) The company commander of the armored engineer company supporting a combat command acts as unit engineer on the staff of the combat commander.

b. Platoon.

(1) The platoon is usually employed as a part of the company; but it may be given a mission in direct support of a task force. The platoon is used in a direct support role for most operations; but it may be attached when

distance and communications make it impractical for the company commander to exercise proper control.

(2) The platoon capability for support of armored operations is built around the armored vehicles. The tank dozer, AVLB (when attached) and armored personnel carriers, directly accompany supported organizations in operations in fire-swept areas of the battle area. It is the armored operations of this nature that emphasizes the different characteristics of this platoon from other combat engineer operations. A platoon task might be concerned with a mine breaching task (fig. 17).

(3) The platoon leader of the supporting armored division engineer platoon is the engineer staff officer for the supported battalion task force. He advises the task force commander on the employment of the platoon.

c. Squad. Because of the limited capability of the squad, it is usually employed as a working component of the platoon. There are times, however, when the squad may be given an independent mission.

35. Communications

a. General. The armored engineer company employs communication equipment designed to facilitate highly mobile engineer operations while in support of armor forces, Organic equipment provides FM radios for internal command and control and for contact with the supported unit.

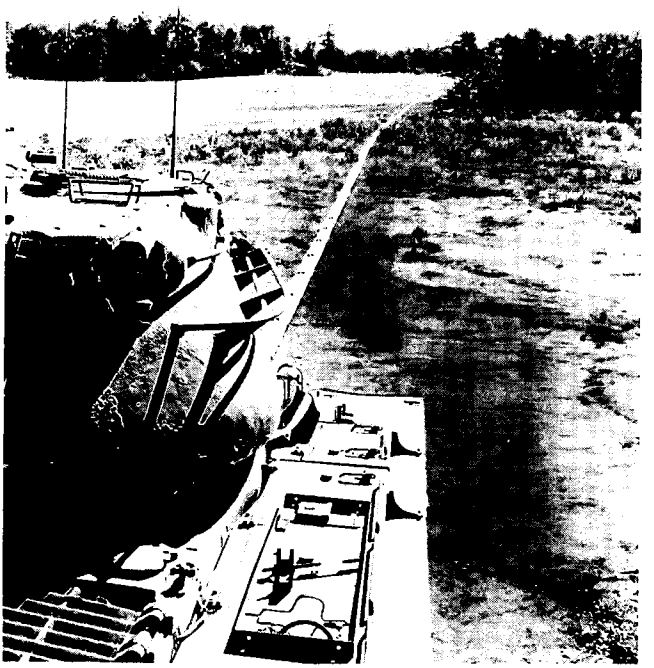


Figure 17. Snake clearing minefield.

b. Radio.

(1) Each company has an AM radio to maintain contact with the engineer battalion headquarters on the battalion command net AM to insure coordination and support of the engineer effort.

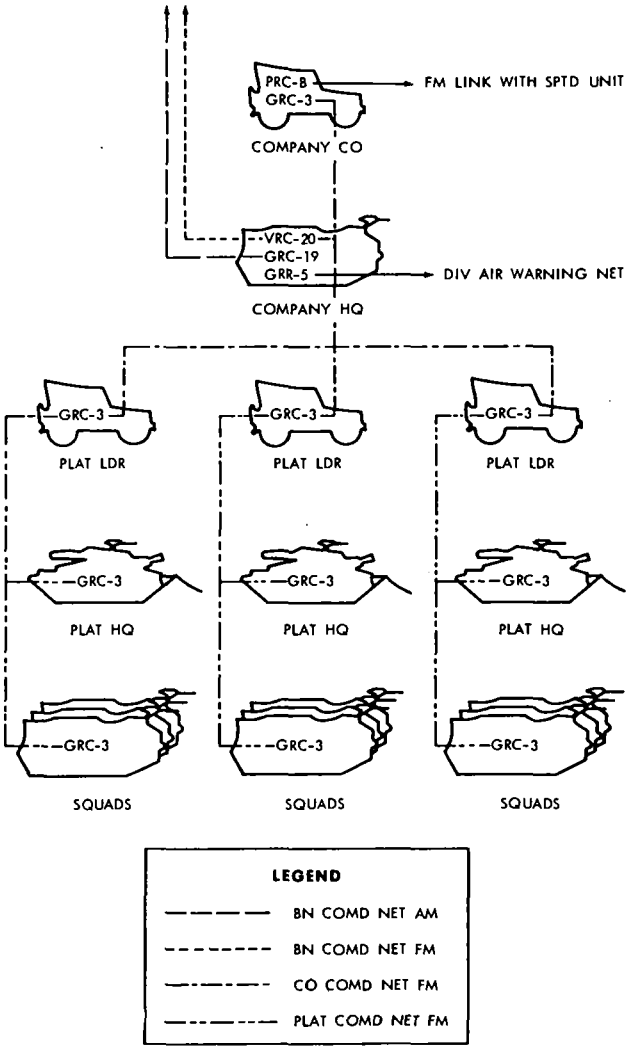


Figure 18. Radio net, armored engineer company.

(2) The company commander maintains contact with his subordinate elements on the company command net FM to facilitate support and coordination of the company mission, and he enters the supported unit command net FM to coordinate assigned missions (fig. 18).

c. Wire.

(1) Engineer companies enter the wire system of the supported organization, and they make full use of the division area communication system for communication with the battalion headquarters (fig. 19). To coordinate flow of materials and related problems during construction projects, engineer units employ wire systems. Communication equipment for this purpose may be issued by the battalion communication section.

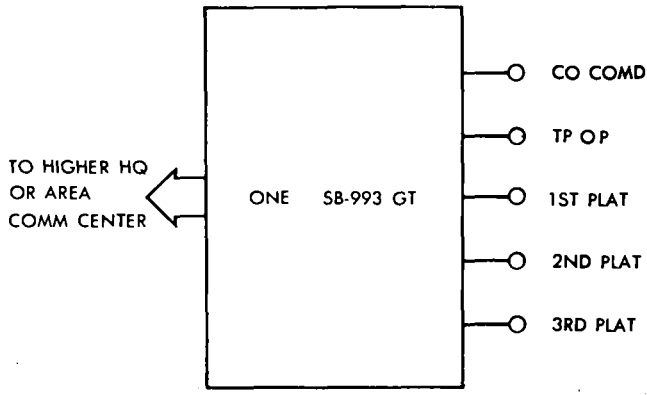


Figure 19. Wire net, armored engineer company.

(2) Engineers should be trained in the installation, operation, and maintenance of wire systems because the companies do not have organic personnel for these requirements.

d. Sound and Visual Signals and Messengers.

(1) Sound signals are used by the companies for alarms. They are usually prescribed in the standing operating procedure (SOP), the standing signal instructions (SSI), or the signal operating instructions (SOI). Such signals may be used to warn of air, CBR, or ground attack or the imminent use of nuclear weapons. Whistles, horns, gongs, small arms, or other noisemakers may be used.

(2) Selected personnel, such as vehicle operators, from the companies and platoons are cross-trained as messengers. They are given messenger service as an additional duty, since the armored division engineer unit TOE's do not authorize messengers.

(3) Visual communication has a special importance to engineer units because of the large number of vehicles without radios. Special application in the use of arm and hand signals may be required for employment of heavy equipment such as earthmoving vehicles. For a discussion on the employment of visual signals, see FM 17–70 and FM 21–60.

e. Platoon. Each platoon leader has the capability of entering two armor band nets and one common band net. These nets include the company command net FM and the supported organization command net FM (usually a battalion task force net).

f. Communication Equipment Maintenance. Each armored engineer company has a communication chief and a radio mechanic. This is not enough to send support with each platoon on a separate mission. However, centralized control of company maintenance is desirable, and these specialists are capable of maintaining an efficient communication system.

Section VI. BRIDGE COMPANY

36. Organization

The bridge company of the armored division engineer battalion is organized under TOE 5–8 into a company headquarters, an assault bridge platoon, and three identical bridge platoons (fig. 20).

37. Mission and Capability

The mission and capability of the bridge company are as follows:

a. The bridge company may be equipped with the M4T6 floating bridge or the class 60 floating bridge and is so organized to maintain and transport three float bridge sets of either type.

(1) When equipped with the M4T6, the bridge company provides one of the following:
   (*a*) One 425-foot float bridge (class 50).
   (*b*) Three 141-foot float bridges (class 50).
   (*c*) Six rafts (class 50).
   (*d*) Fixed spans of various lengths and classes (TM 5–210).

(2) When equipped with the class 60 bridge, the company has approximately the same capabilities as stated in (1) above.

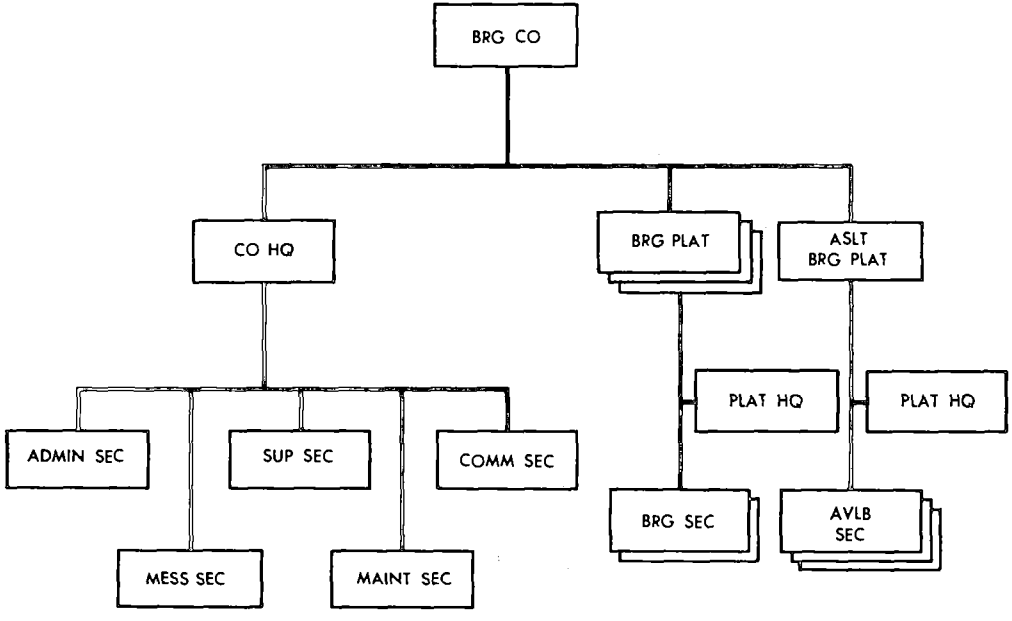


Figure 20. Organization chart, bridge company.

b. Providing assault vehicle launched bridge capability for class 60 assault crossings of gaps up to 60 feet.

c. Providing assault boats for transporting 216 combat troops in one crossing.

d. Providing technical supervision for bridge construction and, in emergencies, constructing bridges or rafts, using only its organic personnel.

e. Transporting large quantities of supplies and equipment with bridge trucks, when the bridge is off-loaded.

f. Defending itself and its installations against ground attack and carrying out armored infantry type combat missions when required.

38. Equipment

The bridge company contains enough five-ton bridge transporting trucks to transport all of its bridge equipment; and it contains the bridge and bridge-erection equipment listed below. The M4T6 and the class 60 float bridges are discussed in paragraphs 37, 42, and 48; and the armored vehicle launched bridge is discussed in paragraphs 37, 43, and 48.

a. Armored vehicle launched bridges.
b. Assault boats.
c. Bridge erection boats.
d. Bridge erection sets.
e. Five-ton bridge transporting trucks.
f. Five-ton wrecker.
g. Float bridge sets (M4T6 or class 60).
h. Gasoline tanker.
i. M48 bridge launchers.
j. Powerboats.
k. Truck-mounted crane.

39. Training

Bridge company training is directed toward making bridge platoon personnel proficient in loading and unloading, maintaining, and erecting stream-crossing equipment. Because members of the platoon often work away from the platoon headquarters, they must be thoroughly trained in day and night convoy and bridging operations and in independent missions.

40. Employment

Subordinate units of the bridge company may be attached to the armored engineer companies to meet special anticipated requirements. The bridge company may be attached intact, or in part, to the armored engineer companies in a pursuit.

41. Communications

a. The bridge company has an AM radio to maintain contact with the engineer battalion headquarters on the battalion command net AM. The commander of the bridge company maintains contact with his subordinate elements on the company command net FM (fig. 21); and he enters the supported unit command net FM to coordinate assigned missions. Both armor band and common band radios are available for this purpose. The bridge company does not have a communication chief; and it has only one radio mechanic assigned. However, AM radio operators are authorized in the company headquarters, and radio-telephone operators are authorized in the bridge and assault bridge platoons, each of which has a separate command net FM.

b. The bridge company is furnished wire equipment to permit communication between the company and

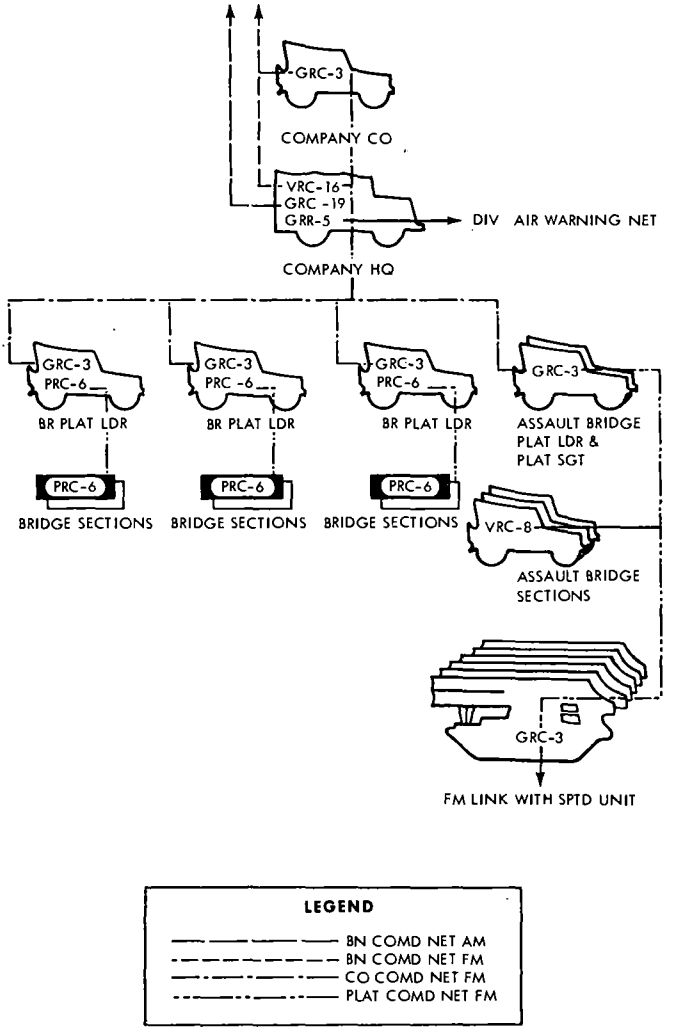


Figure 21. Radio net, bridge company.

the battalion and between the company and each of the platoons (fig. 22).

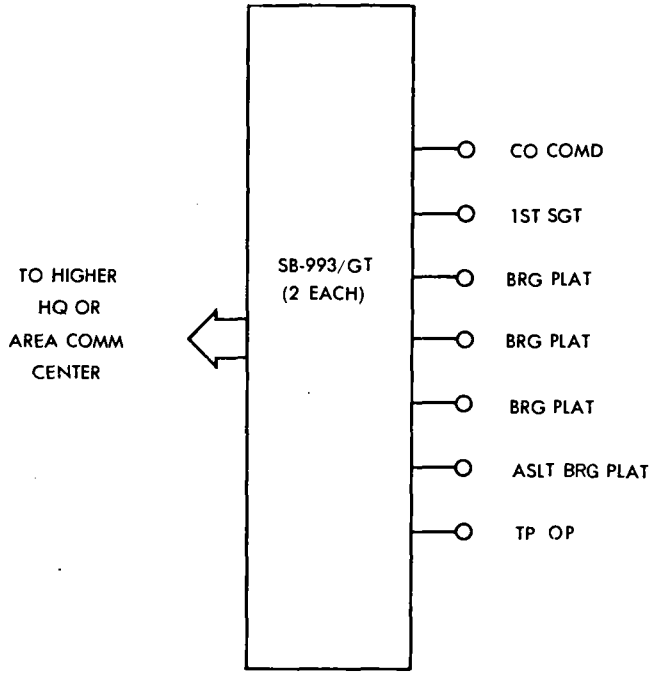


Figure 22. Wire net, bridge company.

42. Bridge Platoon

a. Organization and Mission. Each of the three bridge platoons consists of a platoon headquarters and two identical bridge sections. The platoon's mission is to provide the armored engineer companies with bridging equipment and with technical assistance in bridge construction.

b. Capabilities. Personnel in the bridge platoon conduct engineer bridge reconnaissance, help the bridge company commander prepare plans for the employment of the platoon, and furnish technical assistance to the constructing troops. When only bridge platoon personnel are involved in constructing a bridge, the platoon leader directs and supervises the construction. During a hasty river crossing, if neither the battalion nor the bridge company headquarters is close enough to help, personnel of the bridge platoon headquarters do the bulk of the reconnaissance and bridge planning. They also supervise the operations of the sections.

(1) *M4T6.* The bridge platoon is capable of maintaining and transporting one 141-foot-8-inch M4T6 float bridge set. This bridge set provides one of the following:

(*a*) One 141-foot-8-inch float bridge (class 50).

(*b*) Two 75-foot float bridges (class 50).

(*c*) Two rafts (class 50).

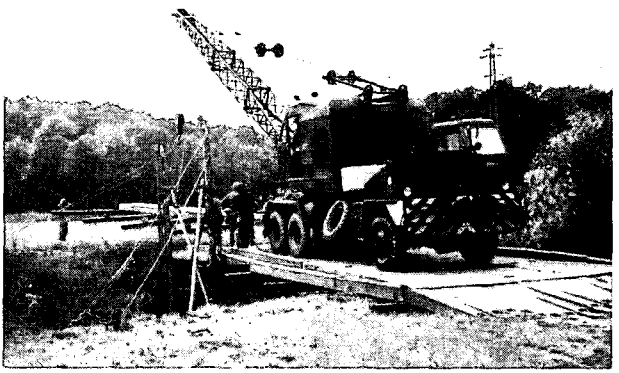


Figure 23. Installation of M4T6 fixed span.

(*d*) Fixed spans of various lengths and classes (fig. 23) (TM 5–210).

(2) *Class 60.* The bridge platoon is capable of maintaining and transporting one class 60 bridge set. This bridge set approximates the capability of the M4T6 set.

c. Communications. Each bridge platoon operates a common band bridge platoon radio command net FM, which may be used by the armored engineer platoons when a bridge section is attached. Each bridge section throughout the companies has a common band radio capability that aids coordination between units.

d. Training. Basic training in the bridge platoon follows the standard pattern. Advanced individual training requires more training time for a bridge platoon than for many other units because of the heavy individual responsibilities. All members of the platoon must be competent truck drivers; and they should be well trained in driver maintenance, emergency repairs, day and night convoy operations, vehicle camouflage, map reading, and driving. They may have to operate a hand radio set, to identify and make minor repairs to all component parts of the bridge, and to act as bridge guards. Members of each platoon must know how to load and unload all the parts of the bridge (fig. 24) that are carried by their sections. Key personnel in the platoon must know the loading plans; and they must also be able to operate the outboard motors and erection boats. Powerboat operators must receive sufficient training to make necessary repairs on their boats. The large number of vehicles needed promptly when a bridge is erected increases the importance of maintenance and inspection schedules.

Figure 24. Short section of fixed span being airlifted

43. Assault Bridge Platoon

a. Organization and Mission. To accomplish its mission of maintaining, transporting, and launching the armored vehicle launched bridge (AVLB) for short-gap crossings, the assault bridge platoon is organized into a platoon headquarters and three armored vehicle launched bridge sections.

b. Capabilities. The assault bridge platoon is capable of providing the engineer companies with nine 60-foot-span AVLB's and six launchers and of providing assistance to the bridge company commander in the employment of the armored vehicle launched bridge.

c. Communications. The assault bridge platoon leader and the launchers have the capability of entering two armor band nets and one common band net. However, a platoon net is not required because these vehicles are not usually employed as a unit. Assault bridge vehicles maintain contact in the bridge company command net FM; or when attached to an armored engineer company supporting a combat command, they enter the armored engineer company command net FM and the supported organization command net FM.

d. Armored Vehicle Launched Bridge Section. The mission of the armored vehicle launched bridge section is to provide AVLB's, with crewmen, to the armored engineer companies which are supporting combat commands. Each section contains two armored vehicle launched bridges with launchers.

e. Spare AVLB's. The three AVLB's which are not mounted on launchers are carried on trucks and are held in reserve in the bridge company unless definite information is available as to possible requirements on a combat command route of advance exceeding the normal allocation of two for each combat command. In this case, AVLB's which are carried on trucks are placed in support of that combat command and are assembled as needed. The launcher returns to a suitable location to pick them up. For detailed information on the transportation, operation, and maintenance of the AVLB, see TM 5–216.

f. Normal Employment of the AVLB. The armored vehicle launched bridge is employed primarily in assault crossings of short gaps by combined arms teams; but because of its mobility, low unit weight, and minimum personnel requirements, it may be used effectively in other ways. It is particulary suitable for spanning streams, antitank ditches, craters, canals, partially blown bridges, and similar obstacles which normally would slow the momentum of attack. The AVLB may be placed over existing bridges or portions of existing bridges to increase the load-carrying capacity of these bridges.

g. Special Employment of the AVLB.

(1) In instances where the flank of friendly forces is on a narrow stream or defile, the assault bridge may be used in making a flanking movement. Similarly, where large numbers of troops are to be shifted along a front in a minimum of time, assault bridging can be emplaced rapidly, using only a few operating personnel.

(2) In rear areas, requirements occasionally arise for short-span bridging. The assault bridge can readily be employed in these situations because of its mobility and speed of erection compared to conventional bridging.

(3) In retrograde movements, assault bridging can be used in place of conventional bridging which has been destroyed or removed. The assault bridge cannot be removed without exposing personnel to small arms fire. If time permits, in retrograde movements, preparation of the launching site will facilitate recovery of the bridge.

h. Command Responsibility for AVLB. Immediate command responsibility for assault bridging equipment and operating personnel normally will be that of the commander of the engineer unit attached to, or providing direct support for, the combat command. The combat command commander will have the command responsibility of when and where to use the AVLB, but the company commander of the supporting company must be ready to advise the combat command commander so that he can make his decision, knowing the capabilities and limitations of the AVLB for a given situation.

i. Typical Situation for Employment of the AVLB.

(1) A short gap is encountered, or its existence has been determined from intelligence.

(2) The proposed crossing site is reconnoitered as quickly as possible by supporting engineers or representatives of the crossing forces, or both, to determine the length of the gap and the bank conditions, mark crossing points, locate access routes, and obtain other necessary information.

(3) Once the crossing site has been established, the mobile assault bridge is brought forward and quickly emplaced, and the force continues the advance. In instances where the gap is strongly defended, mass supporting fire and smoke should be used as protection for the bridge.

(4) During the time the tactical column is crossing, a replacement is loaded on the launcher and the launcher rejoins the attack echelon.

j. Recovery of the AVLB. The mobile assault bridge should be left in place across the gap only as long as it is needed. The bridge may be left in place to permit the

crossing of units following the assault elements, or to provide routes for subsequent logistical or other tactical movement. In this event, a new assembled assault bridge is brought forward and placed on the launcher. The launcher then moves to rejoin the supported assault unit. Assault bridging which has been left in place becomes the responsibility of corps or army engineers. The decision on whether the assault bridge is left in place rests with the crossing force commander, who normally coordinates with the division commander and the division engineer. The division engineer arranges transfer of responsibility with appropriate engineer units.

44. Mobile Floating Assault Bridge (MOFLAB)

The bridge company of the armored engineer battalion may be equipped, when authorized, with the mobile floating assault bridge (MOFLAB) instead of the M4-T6 or the class 60 floating bridge.

a. Mission. The mission of the MOFLAB company is to provide technical personnel and equipment to load, maintain, transport, erect and operate tactical mobile stream crossing equipment.

b. Organization. The MOFLAB company of the armored division engineer battalion is organized into a company headquarters, an armored vehicle launched bridge platoon and two amphibious vehicle float bridge platoons.

c. Capabilities. The company has the following capabilities:

(1) Provides equipment to construct bridges or ferries in the following combinations:

(*a*) One 472 feet of mobile assault floating bridge (fig. 25), or

(*b*) Two 262 feet of mobile assault floating bridges, or

(*c*) Four 157 feet mobile assault floating rafts (fig. 26).

Figure 25. M–48 tanks crossing on MOFLAB.

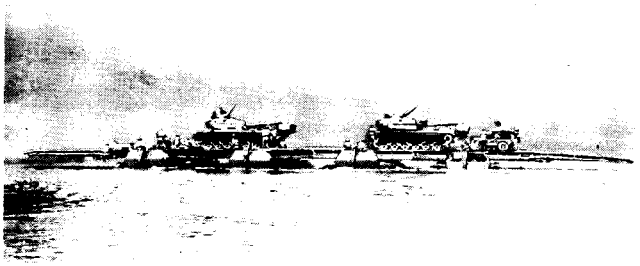


Figure 26. Four-unit MOFLAB raft.

(2) Provides armored vehicular launched bridging capable of crossing class 60 loads over gaps up to 60 feet in width.

(3) Provides organizational maintenance on organic vehicles and equipment.

d. Employment.

(1) The MOFLAB is employed to enhance the movement of elements of the armored division

by providing mobile bridging equipment in support of assault crossings. The MOFLAB is a self-contained amphibious-type class 60 bridge designed to facilitate rapid river crossings. The units utilized in the construction of the bridge or rafts are as follows:

(*a*) The amphibious bridge vehicle (fig. 27) carries 26 feet 3 inches of deck, which is folded for road travel. On entering the water, the deck section is rotated 90°, widened to 13 feet, and the center portion of the deck is hydraulically lowered into position, filling the deck completely. The unit is then connected to the next unit.

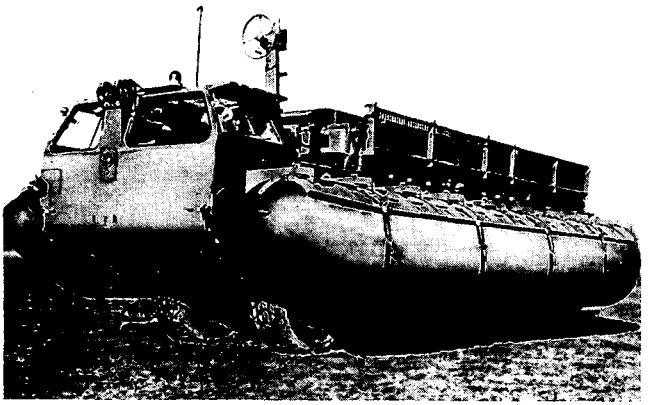


Figure 27. Amphibious bridge vehicle.

(*b*) The amphibious ramp vehicle carries the ramp, which is 26 feet 3 inches long. Upon entering the water, the ramp section is

rotated 90° and connected to a bridge unit. The center portion of the ramp is filled with panels that are attached by means of hinges. The ramp is then hydraulically lifted and the ramp vehicle unit is removed.

(2) These units are highly mobile, have an operating range of 350 miles and are capable of 40 miles-per-hour speeds. They are capable of negotiating soft terrain and 50 percent slopes; and under suitable bank conditions, they can enter or leave the water without assistance.

e. *Functions.*

(1) *Company headquarters.* Commands, directs and supervises assigned personnel in the accomplishment of assigned missions. Provides support functions such as administration, mess, supply, communications, and organizational maintenance.

(2) *Armored vehicle launched bridge platoon.* Provides necessary personnel to man and operate six AVLB's. The platoon consists of a platoon headquarters and three AVLB sections, each AVLB section operates two AVLB's mounted on tank chassis and provides one extra AVLB which is carried on transportation organic to the section.

(3) *Amphibious vehicle float bridge platoons.* Each platoon provides necessary personnel and equipment to transport, operate, and maintain eight amphibious bridge vehicles and four amphibious ramp vehicles. Maintenance personnel are included as one of the crewmen for each bridge and ramp unit to perform maintenance, either on land or on the water.

CHAPTER 3

ENGINEER SUPPORT IN OFFENSIVE OPERATIONS

Section I. ADVANCE TO CONTACT AND THE ATTACK

45. Advance to Contact

a. Disposition of Engineer Troops. The armored division, as a general rule, does not conduct offensive operations alone, but participates as part of a larger force. In participating in offensive operations, small armored units might be required to conduct an attack or an advance to contact. The division engineer recommends disposition of available engineer troops and equipment for all phases of the advance and attack, based on the scheme of maneuver announced by the division commander. He recommends appropriate changes in disposition as the need arises.

b. Specific Engineer Duties. When an armored combat command advances to contact, speed is essential. Maximum use of existing road nets and avenues of approach is emphasized. Early seizure of critical terrain is also important. Nuclear fires, including atomic demolition munitions (ADM), an engineer responsibility, may be employed to provide added security by blocking enemy avenues of approach. Other engineer duties in the advance include conducting

reconnaissance; opening and improving roads (fig. 28), trails, and bridges for troop movement, supply, and evacuation; reducing obstacles; constructing bypasses (fig. 29) over small streams and ditches; and assisting in flank security.

Figure 28. Armored engineers clearing road of roadblock.

Figure 29. Hastily installed bypass.

c. Engincers in Covering Force. When a combat command is operating as the division covering force, it usually has an engineer company and an assault bridge element attached.

46. Attack

a. Penetration. In the penetration, armored division engineers generally are attached to each assaulting combat command. The size of the engineer elements attached is governed by the anticipated strength necessary to reduce obstacles and to support the advance of the assaulting forces (fig. 30). Bridging is so positioned that it is available when needed. When the situation warrants, armored division engineer elements can be attached to each leading task force. Engineers held under division control have the mission of assisting in the movement of the division.

b. Exploitation.

(1) *Division in column.* When the combat commands of the division are in column, an engineer company, with a bridge platoon and assault bridges attached, is usually attached to the leading combat command. If additional bridging is attached to the division by corps, it may be kept under division control until it is needed by the leading combat command, or until a following major command is committed to action or placed on another axis of advance.

(2) *Division in line.* When two or three combat commands are following independent axes, each is given sufficient engineers and bridging equipment to facilitate movement over its assigned axis.

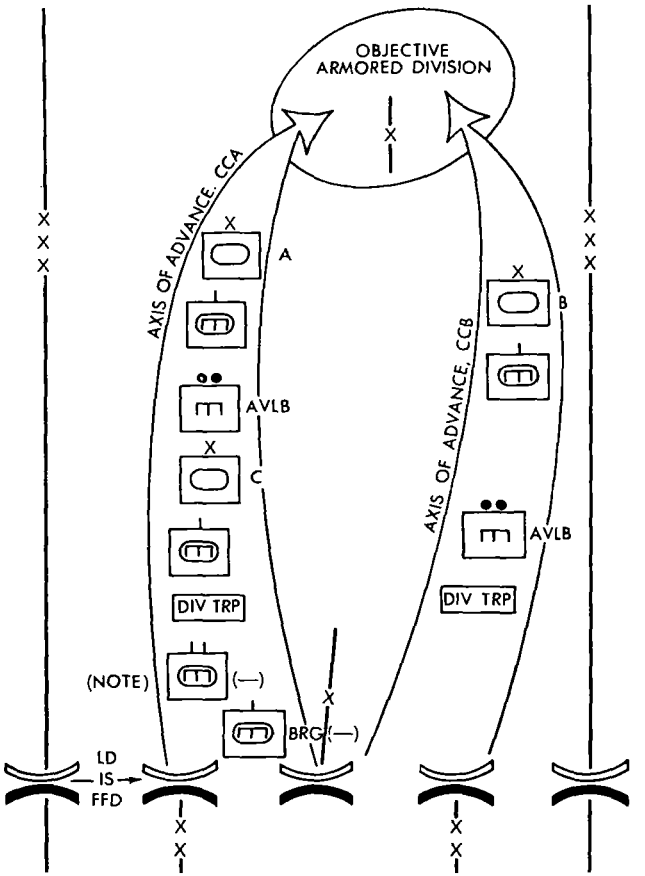


Figure 30. Typical disposition of the engineer battalion in support of the armored division making a penetration.

c. Breaching Obstacles. The engineers breach the outer and larger obstacles which protect the enemy's position. Reduction of weapons emplacements, bunkers, and pillboxes and the clearing of close-in and minor obstacles are the mission of specially organized and equipped armored infantry squads which lead the attack. This means that the effective gapping of a strong enemy fortification system requires close coordination between the engineers, who gap the line of obstacles, and the tank-armored infantry teams who reduce the fortifications. Combat engineer vehicles from the platoons of the engineer companies are particularly designed for this type of combat and should be placed well forward in the column to provide maximum support.

Section II. RIVER AND GAP CROSSINGS

47. River Crossing

In an operation which involves crossing a river, the immediate purpose is to move the assault units across as rapidly and economically as possible so that they may continue their attack to destroy the enemy or to seize an assigned objective which will protect the crossing of the remainder of the units. A river crossing is the tactical commander's responsibility, but the division engineer plans continually for the support of division river crossings in the offensive. For major crossings, the division must be supported by corps and army troops, and the division engineer must make his requirements for support known as early as possible to the corps engineer. In establishing those requirements, the division engineer must maintain close liaison with G3 on plans, exploit all sources of intelligence to determine what may be needed, and perform constant

reconnaissance to specifically determine his requirements. Engineer tasks in the crossing include guiding the assault echelon to the crossing site, operating assault boats, assembling and operating rafts, assembling and maintaining footbridges and heavy vehicular bridges, removing mines, constructing approach roads, and preparing armored personnel carrier (APC) entrances and exits. FM 31–60 contains a detailed discussion of engineer duties in river-crossing operations. Plans for crossing a river over which the enemy has destroyed all bridges depend on several factors, including the strength with which the enemy holds the opposite bank and the characteristics of the river. There are two general types of crossings—a deliberate river crossing and a hasty river crossing.

a. Deliberate River Crossing. A deliberate river crossing is necessary if the opposite bank is strongly held or if the natural obstacle is technically difficult. Detailed planning, extensive logistical preparation, and air and ground superiority are required. Overall planning and coordination are performed by corps or higher commands. The armored division is seldom employed in the assault phase of a deliberate river crossing. The armored division usually moves through a deliberate crossing, forced by an infantry division, to break out of the bridgehead. The armored division engineer battalion, in a deliberate river crossing, is normally held out to provide engineer support when the division is committed on the far shore. Some elements of the battalion may be used to operate assault boats during the assault phase or to perform preliminary work on bridge approaches or access roads before the assault. In any case, armored division engineers should not be employed where they cannot be with-

drawn to accompany the armored division over the river and to provide forward engineer support for combat commands. It is desirable to use bridging from corps and hold organic bridging for support operations on the far shore. Extensive operations require backup support from corps or army in the form of additional engineer units with fixed, floating, and assault bridging equipment.

b. Hasty River Crossing. The hasty river crossing is normal for the armored division. It must be boldly executed, to insure surprise and to prevent the organization of strong defense. Detailed reconnaissance and planning are secondary to speed. The one vital consideration is that the tempo of the advance of the armored division must not be disturbed. Frequently, aggressive action will result in the capture of a bridge before the enemy has destroyed it. At other times a damaged bridge can be repaired, but in most cases, military bridging is necessary in support of tanks. The armored personnel carrier, because of its ability to swim (fig. 31), is used to move supplies and personnel across the river where there are no bridges. These vehicles may also be used to supplement the carrying capacity of bridges and rafts for taking high-priority items across or for other special purposes. Hasty crossings must be anticipated, and all available river-crossing equipment must be well forward and used promptly. When the opportunity for such a crossing is presented to an advance force, supporting engineer troops assist in the immediate crossing and exploitation. The armored division engineer battalion constructs bridges and other necessary crossing means as soon as possible, to cross additional divisional troops that are rushed forward to expand the initial successes.

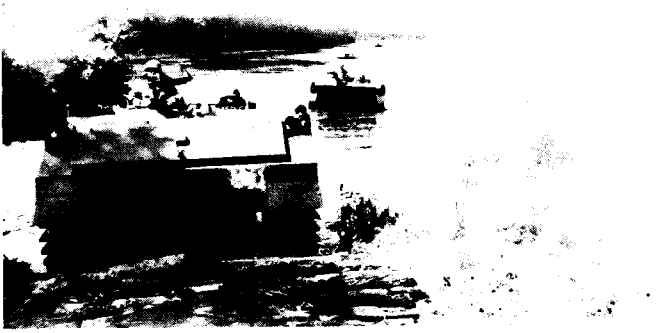


Figure 31. Personnel carriers swimming.

c. Crossing Means. Every available crossing means is used to cross the maximum number of troops and equipment in the shortest time. The armored personnel carrier and the helicopter are two important means of getting personnel and supplies across the river. If necessary, the armored division engineer battalion constructs rafts (fig. 32) or expedient bridges, These are used to cross tanks, additional personnel, ammunition, heavy weapons, equipment, and necessary vehicles to support the bridgehead. If the bridging is left in place, the bridge company immediately obtains replacement bridging from the nearest engineer depot and rejoins the supported unit. On the other hand, although infrequently, the bridging may be disassembled by one of the armored engineer companies or the bridge company and reloaded on the bridge trucks, which return to the supported organization for the next bridging op-

eration. For a detailed discussion of general river-crossing equipment, see TM's 5–210 and 5–320. The specific river-crossing equipment organic to the armored division engineer battalion is discussed in paragraphs 42 and 43.

Figure 32. Five-float raft with tank.

d. Desirable River-Crossing Characteristics. The following desirable characteristics are sought in river-crossing operations:

(1) *Raft site.* Raft sites are normally located downstream from bridge sites. They should be close to existing roads at points where the current is moderate and where banks can accommodate two or more rafts without landing stages.

(2) *Floating-bridge sites.* Floating-bridge sites should have the following characteristics:

(*a*) Short, easily constructed approach roads to existing road nets on both sides.

(*b*) Moderate current.

(*c*) Firm stream banks that can support abutments.

(*d*) Assembly arcas where floats may be inflated and launched. Pontons are usually launched downstream from the bridge site. When tributary streams exist, it may be desirable to float pontons to the bridge from launching sites on the tributary.

(*e*) Turn-arounds for vehicles at unloading points.

(*f*) Small variations in water level. Allowances must be made for changes in water level and velocity of current caused by floods and tides, particularly for their effect on the required anchorage.

(3) *Amphibious vehicle sites.* The use of amphibious vehicles dcpends on avialability of suitable entrances and exits to and from the river and on moderate stream currents (not exceeding five miles per hour). Amphibious vehicles require crossing sites of a gentle gradient and with a firm bottom for entering or leaving the water. The landing places must be wide enough to allow amphibious vehicles to land even though subjected to the lateral force of the stream current. Engineer support must be made available to reconnoiter, locate, and improve or construct amphibious vehicle crossing sites.

48. Gap Crossing

a. Types of Gaps. Thc gaps to be crossed may consist of anti-tank ditches, road craters, streams, canals,

railroad cuts, and similar obstacles frequently found in the combat zone.

b. Equipment. The armored vehicle launched bridges are used to cross short gaps in a minimum of time and with minimum exposure of bridging personnel to enemy fire. They are crew-served, highly mobile, and capable of quick erection (fig. 33) so that the crossing of forward combat elements may be made rapidly. Rapid placement of bridging by the armored vehicle launched bridge launchers helps maintain the momentum of attack. This bridging may also be utilized in emergencies to span gaps up to 60 feet on main supply routes to save time, troops, and bridge resupply tonnages that would be required for fixed bridging. Fixed bridging constructed from the components of the M4T6 or the class 60 bridge sets may be used to cross small gaps of various widths. See TM 5–210 for types and classes.

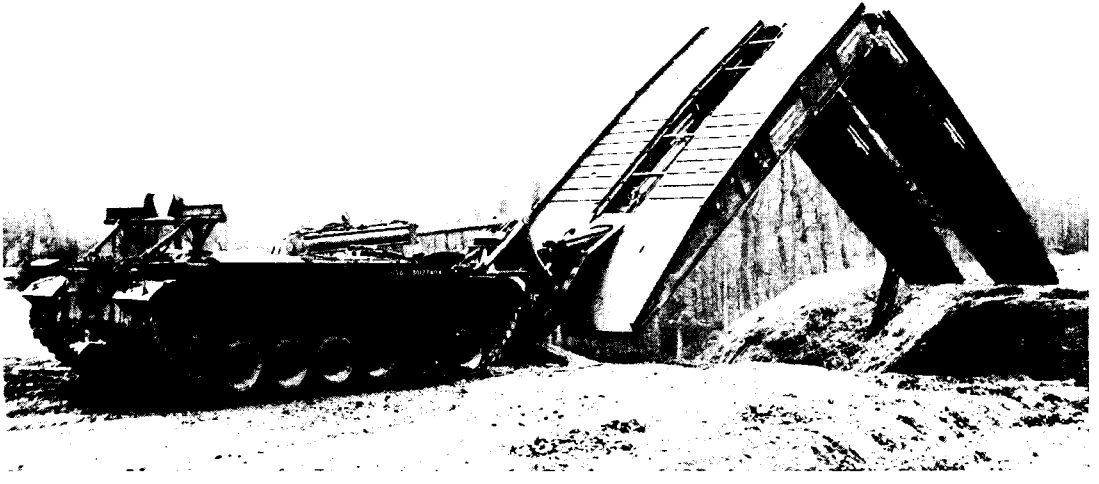


Figure 33. AVLB being erected.

CHAPTER 4

ENGINEER SUPPORT IN DEFENSIVE OPERATIONS

Section I. FORMS OF DEFENSE

49. Responsibility for Assuming the Defense

The armored division is designed primarily for offensive action, but it is capable of conducting an effective defense. The division may assume the defense when, as part of a larger force, it is ordered to do so in accordance with the plan of the higher commander. When operating independently, the armored division may assume the defense on its own. Such occasions may occur when the division is exploiting or pursuing and is attacked by a superior force or when it has reached its objective and must defend until the remainder of the corps reaches the area. There are two basic forms of defense: the mobile defense and the area defense.

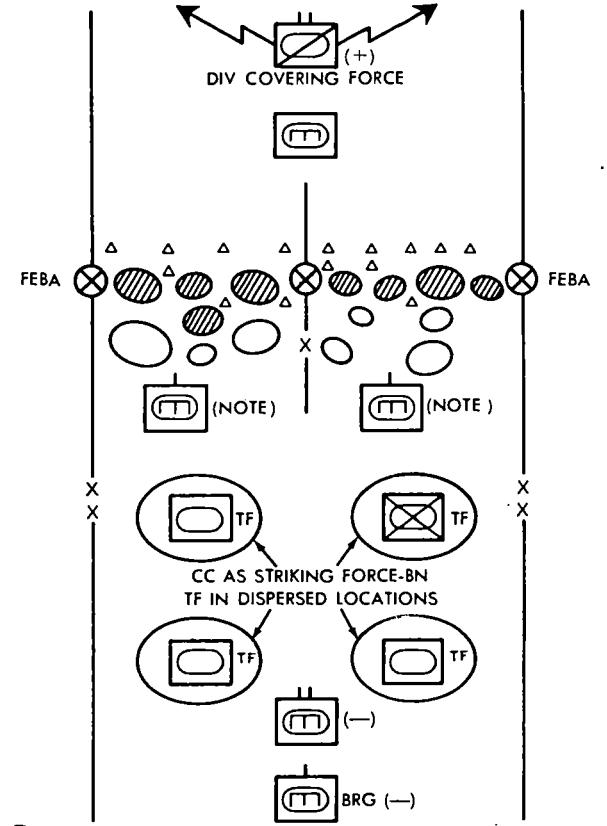
50. Mobile Defense

In the mobile defense, minimum forces detect the enemy and canalize him into areas in front of or within the defensive area where the striking force attacks and destroys him. The mobile defense makes maximum use of the mobile combat power of armor units. Engineers make necessary repairs or improvements to roads

and bridges on all routes selected for the movement of the striking force. Engineers with the combat commands in the forward defensive area improve routes to permit rapid movement of strong points. When authorized, ADM may be used to deny areas to the enemy and strengthen the defensive position. Armored division engineers may be retained under the control of the division engineer or attached to a combat command. The criteria for attachment or support are the tactical situation and the ability of the parent battalion to control and direct the action. Figure 34 shows a typical disposition of the armored engineer battalion in a mobile defense.

51. Area Defense

a. In the area defense, the efforts of the defending force are directed toward stopping the enemy at a preselected line of defense. When the division commander decides to direct his efforts toward holding ground rather than toward the destruction of the enemy, he assigns tank and armored infantry elements to the combat commands in the proportion needed. Generally, the bulk of the armored infantry units occupy the forward edge of the battle area while the majority of the tanks, minus those attached to the combat commands in the forward edge of the battle area, are held in division reserve. Combat commands on the forward edge of the battle area assign each battalion task force a sector to be defended or a reserve mission. The division commander specifies the type of defensive position to be used and the priorities of construction. The division engineer advises the commander on such matters as obstacle selection, mine laying, camouflage supervision, supply of class IV



⊗ FORWARD EDGE OF BATTLE AREA.

△ OBSERVATION POST.

STRONG POINTS VARYING IN SIZE FROM PLATOON TO BATTALION TASK FORCE.

ALTERNATE POSITIONS.

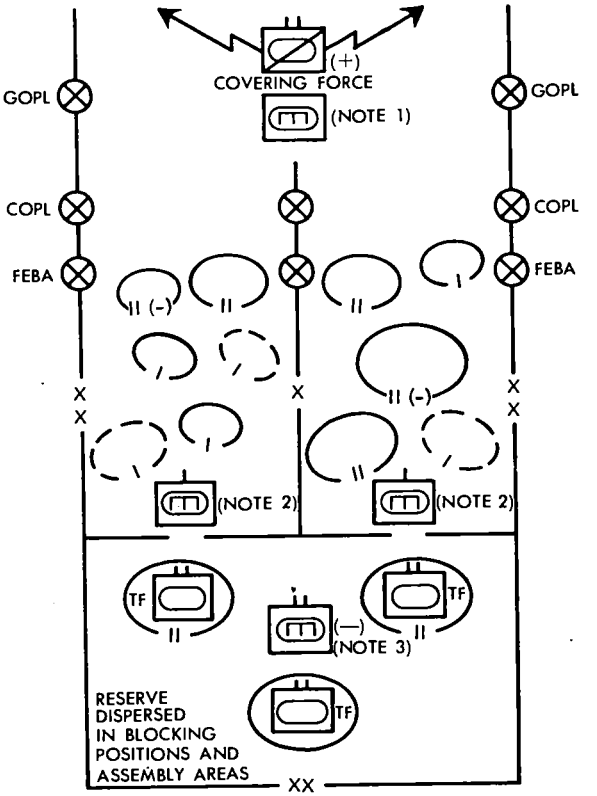
NOTE: Engineers may be attached to, or placed in support of, CC.

Figure 34. Typical disposition of the armored division engineer battalion in a mobile defense.

camouflage and fortification materials, and employment of engineer troops. Engineers prepare important demolitions. They also prepare routes for counterattacks, for evacuation, and for movement of supplies. They give technical advice to other troops on laying minefields; and they lay certain minefields, such as those on flanks. The division engineer assists in the formulation of the overall barrier plan and its implementation.

b. Armored division engineer elements may be retained under control of the division engineer and support the action of the combat commands. Engineer elements attached to the combat commands are kept under combat command control (fig. 35). They are seldom attached to the battalion task forces.

c. Obstacles are used extensively in area defense. Time permitting, the defensive capabilities of the ground are augmented by artificial obstacles and improvement of natural obstacles until a barrier system has been created, through which the enemy cannot penetrate without a costly expenditure of men and materials. The installation of obstacles is the responsibility of the area or sector commander; however, the commander may call upon engineers to supervise the construction and, if necessary, to perform the construction. For prescribed types of fortifications, see FM 5–15.



FEBA ⊗ FORWARD EDGE OF BATTLE AREA

COPL ⊗ COMBAT OUTPOST LINE

GOPL ⊗ GENERAL OUTPOST LINE

NOTE 1: Engineer element attached to covering force.

NOTE 2: Engineers may be attached to, or in support of, CC.

NOTE 3: Engineer battalion (—) provides support to the division as a whole. Prepared to provide engineer company to division reserve when committed.

Figure 35. Typical disposition of the armored division engineer battalion in an area defense.

Section II. DEFENSE AGAINST NUCLEAR WEAPONS

52. Command Responsibilities

The nuclear defense training of the organization and of the individuals in the organization and the protection of the unit against nuclear weapons effects are basic responsibilities of the command. Some aspects which may be expected to require consideration by unit commanders are discussed in FM's 21–40 21–41, 21–48, and TC 101–1.

53. Individual and Small Unit Training

Because armored forces normally operate well forward on the battlefield, increased emphasis must be placed on individual and small unit training for protection against nuclear attack. Further guidelines for protection against nuclear weapons are contained in paragraph 72.

Section III. RETROGRADE MOVEMENTS

54. Definition

A retrograde movement is a movement to the rear or away from the enemy. It may be forced by the enemy, or it may be voluntary; but it must be approved by higher headquarters.

55. Types

Retrograde movements include withdrawals, delaying actions, and retirements.

a. Withdrawal. A withdrawal is an operation by which all or part of a deployed force disengages from the enemy. If the routes of communication between the assembly area or rearward position are open, the

supporting engineers create barriers to the enemy. These barriers include minefields, abatis, and destroyed bridges. If the routes of communication are not open between the withdrawing forces and the new area, the engineers first open these routes to allow the main forces to withdraw; then they create barriers to the enemy.

b. Delaying Action. A delaying action is an action in which a unit trades space for time and inflicts maximum punishment on the enemy without becoming decisively involved in combat. Engineers participate in delaying action by destroying bridges, blocking roads (fig. 36), installing antitank and antipersonnel minefields, and erecting barriers. Usually, supply trains, including those carrying engineer supplies and equipment, are among the first to move to the rear. However, in the delaying action, requirements for demolitions, barbed wire, and other barrier supplies normally increase; and it may become necessary to

Figure 36. Road obstacle.

prestock certain supplies on successive delaying positions or along routes of withdrawal. Also, in order to meet the needs of engineers with the security elements, it may be necessary to operate engineer supply points near the covering forces until they withdraw.

c. Retirement. Retirement is an operation in which a force not in contact moves away from the enemy. During the retirement, the engineer elements perform road and bridge maintenance to allow retiring troops to keep moving.

Section IV. DENIAL OPERATIONS

56. Definition

A denial operation is a defensive measure designed to prevent or hinder enemy occupation of, or benefit from, areas or objects having tactical or strategic value.

57. Responsibility

In accordance with the denial policy of higher headquarters, the armored division commander provides for the denial of both military and civilian supplies, equipment, and installations within his area. A denial operation is generally a major task, requiring a high degree of technical skill and considerable time for detailed planning, careful preparation, and execution. The armored division engineer battalion is particularly suited for executing denial operations, and extensive use is made of engineer equipment and demolitions. It is a command decision to determine when preliminary work is to be done and when plans will be put into effect. Like other units, the engineer battalion has a standing operating procedure for the destruction of its own supplies and equipment.

58. Items Denied the Enemy

All possible military supplies and equipment are evacuated. The remainder is destroyed. The armored division and the engineer battalion are interested mostly in the denial of such items as—

a. Military equipment and installations.

b. Military supplies.

c. Communication facilities.

(1) Railroads and rolling stock.

(2) Airstrips.

(3) Bridges.

(4) Highways.

(5) Signal communication items.

d. Public utilities—powerplants, reservoirs, and port and dock facilities.

59. Denial by Removal

Evacuation of materiel is as much a part of denial operations as destruction. Evacuation must be started early and conducted in accordance with prepared priority lists. Every available means of transportation must be used to capacity, to save as many supplies and as much equipment as possible.

60. Denial by Destruction

a. All possible methods of destruction are used. The most common are—

(1) Fire.

(2) Flooding or drenching.

(3) Mechanical methods, such as breaking with a sledge hammer or cutting with an oxyacetylene torch.

(4) Explosives (FM 5–25), including ADM.

(5) Contamination.

(6) Projectiles—small arms, artillery, and bombs.

b. So that destruction may be executed at the desired time, personnel to destroy each item must be designated in advance; supplies necessary for the destruction must be estimated and assembled at convenient locations; circumstances under which the destruction is to take place must be definitely prescribed; and, if orders for destruction are to be issued, the means of transmission must be provided.

61. Atomic Demolition Munitions

a. Atomic demolition munitions may be used in denial operations. Normally, the officer responsible for the execution of an atomic demolition mission will be the commander of the ADM firing party. The designated commander should be highly trained in all aspects of the ADM operations that are the responsibility of engineer personnel. He ordinarily directs all operations at the emplacement site, takes emergency action in the event of a change of mission or misfire, and detonates the ADM on order from higher headquarters.

b. Engineer personnel prepare the emplacement site under the direction of the ADM firing party commander. This may include providing appropriate access roads, installing antitank and antipersonnel minefields or other obstacles when ordered, camouflaging the area to avoid disclosure of the operations, providing immediate security, and providing communication facilities. Engineer personnel install the ADM in the emplacement and complete all preparation of the munition and site. Detailed information on the employment of atomic demolition munitions is contained in FM 5–26.

Section V. SECURITY

62. Responsibility

The armored division engineer battalion commander is responsible for the security of his battalion and all its units, regardless of the security furnished by the armored division. However, in determining the security measures for the battalion, the commander takes into consideration the security measures of the armored division. If the division has a strong security force, the battalion commander does not establish a large security element.

63. Definition

Security embraces all measures taken by a command to protect itself from espionage, observation, sabotage, annoyance, or surprise. It may be active or passive. Active security involves firepower and the use of troops. Passive security includes observation, cover, dispersion, camouflage, and the use of obstacles. The armored division engineer battalion commander employs a combination of the two.

64. Provision

Security detachments are required in all situations. Their mission is to protect against surprise attack and observation by enemy ground and air forces and to maintain freedom of action for the command by gaining the time and space required to make proper dispositions to meet a threat. Since security forces lessen the strength of the main force, they are kept to the minimum strength necessary to accomplish their missions. They should be as mobile as the enemy force with which they may have to deal; and they

should have an efficient warning system, including observers and means of communication, to give prompt notice of any enemy threat from the ground or the air.

65. During Movement

All movement in the combat zone is governed by strict security regulations, with special attention to the possibility of air attack. Distance between vehicles is greater than in rear areas. Panel sets are kept in readiness for instant use to avoid attack by friendly aircraft. The armored division engineer battalion must be well trained in passive defense against air attack. When there is a possibility of ground attack, as in a fluid situation or when guerillas are operating in the region, tactical plans are made by the battalion commander and subordinate commanders to meet the attack. A system of observers and signals is established. Individual weapons and ammunition are kept in the hands of the troops. Machineguns are manned, and rocket launchers are dispersed throughout the column. Tactical considerations, rather than administrative considerations, govern the conduct of the march. During a night march, the importance of route reconnaissance and the proper use of road guides and markers increases. An armored engineer company moving on an independent mission provides its own security. It requires security for the front (advance guards), for the rear (rear guards), for the flanks (flank patrols), during halts (march outposts), and against attacks from the air. Engineer units usually move by motor. When they do, their security detachments are also motorized. The engineer company commander provides all-around security when there is danger of contact with the enemy. The security techniques

which he employs depend on the company mission, terrain, time of day, and expected enemy actions.

a. Frontal Security.

(1) Security in front is provided by an advance guard. For the battalion, its strength usually does not exceed a company; for a company, a platoon; and for a platoon, a motor patrol of one or two vehicles.

(2) The mission of the advance guard is to prevent unnecessary delay of the main body and to protect it from surprise and limit enemy observation from the front. An advance guard accomplishes its mission by searching the terrain to the front and on each side of the line of march and by overcoming hostile resistance that is contacted. When contact with the enemy is made, the advance guard will attack aggressively to overcome resistance within its capabilities. If the enemy force is too large for the advance guard to attack, the advance guard will cover the deployment of the main body by maintaining pressure against the enemy.

(3) A company acting as the advance guard for the battalion sends forward a platoon as the advance party. This platoon, in turn, sends forward a squad as a point. The remainder of the company constitutes the advance guard minus.

(4) In the smaller units, such as the company and platoon, the advance guard usually consists of a point and an advance party.

(*a*) The point is the leading element in the movement. It protects the column from

enemy surprise. When the point encounters the enemy, it employs rapid fire and maneuver against the enemy force. It maintains contact with the enemy until the advance party has time to deploy.

(*b*) The advance party provides support for the point in the event that the point fails to eliminate the enemy. The advance party takes aggressive action against the enemy and tries to overcome the force so that movement of the main body is not delayed or halted. If the advance party fails to eliminate the enemy force, it maintains contact with it until the advance guard minus can be committed.

(*c*) The advance guard minus maintains contact with the advance party and should always be prepared to assist the advance party in moving against the enemy force. If the advance guard minus is unable to reduce enemy resistance, it immobilizes the enemy by fire and maneuver until the arrival of the main body.

(5) Distances between the point and the advance party, between the advance party and advance guard minus, and between the advance guard minus and the main body vary according to the speed of movement and the terrain. These distances are great enough to allow each succeeding element to deploy without serious interference from the enemy when contact is made. However, these distances are not great enough to prevent each element from rapidly assisting the element in front of it. At high

speed, distances are increased; at low speed, they are decreased. Vehicles are spaced at distances of from 50 to 200 yards in order to provide protection against air attack and to maintain uniform speed

b. Rear Security

(1) Rear guards are used to protect the rear of a column advancing toward the enemy if an attack or harassing action from the rear is deemed within the enemy capabilities or to protect the rear of a column marching away from the enemy.

(2) A company should adopt a formation similar to that of the advance guard in the reverse order of march. The distances between elements of the rear guard vary with the situation, the terrain, and the visibility. They correspond generally to the distance between elements of the advance guard. When the column halts, the rear guard dismounts and forms a march outpost.

(3) When an enemy pursuit is close, elements of the rear guard delay the enemy to permit the next preceding unit to make suitable dispositions. Fire is opened at long range. Usually, elements do not move toward the enemy to reinforce a lower element. The larger element occupies a delaying position to cover the withdrawal of the smaller element. The element in contact with the enemy then withdraws under the protective fires of the element occupying the delaying position. The rate of movement is coordinated with the main body.

(4) The rear point stops to fire only when enemy action threatens to interfere with the march. The rear point is not reinforeed by other troops. When the rear point withdraws, it uses a route that does not mask the fire of the rear party.

c. Flank Security. In open terrain, flank security may be sufficiently assured by speed of movement and constant observation to the flanks. This usually will not suffice, however, in heavily wooded, rolling, or mountainous terrain, or where the menace of guerilla operations exists. Continuous flank patrolling is possible only where a parallel route exists (a eondition not usually enjoyed by units of company size), but effective employment ean be made of small flank patrols sent out to side roads, eommanding ground, and points of observation. Flank security detachments usually are not strong enough to effectively delay the enemy. Their mission is to give early warning of enemy activity; hence they must be equipped with adequate communication facilities.

d. Motorized Security Patrols. The motorized security patrol is used for reconnaissanee and all types of security operations and partieularly as the point of an advance or rear guard. Motorized patrols are limited in effectiveness by the faet that they are roadbound and easily ambushed and captured or destroyed. Therefore, at least two vehicles, plus any other vehieles required for mcsscngers, are required. An engineer company moving alone has enough vehicles, weapons, and men to use more than one vehicle in either its advance or rear security patrol.

e. Security in a Retirement. Strong mobile advanee, rear, and flank guards are required in a retirement.

The rear guard is the principal security of each column. Its composition and size depend on the size and imminence of enemy attack.

66. At Halt and in Assembly Area

a. Outpost System. Whenever an engineer unit is at a temporary halt during a march or is in the assembly area, it provides its own security. It does this by establishing an outpost system. The outpost's duty is to secure the main body against close observation and surprise by the enemy. It is organized and disposed so that it can deal with a minor enemy threat without disturbing the main body or forcing it to take action and so that, in case of a major threat, it can at least hold off the enemy until the main body can make preparations for action. The composition of the outpost varies for each situation. The outpost system consists of sentinels, outguards, and visiting patrols. Larger units will find it necessary to employ all of the components of the outpost system. Smaller units generally combine two of these components. Communication is established between all elements of the outpost system and the main body. If the enemy penetrates any portion of the outpost system, the main body takes measures to protect itself. The measures provide for personnel who form a support or reserve force which counters the enemy penetration. All other personnel take action to secure the unit's immediate area. Interior guards, designated from elements of the main body, continue to carry out their duties within their assigned area. The engineer unit commander, if possible, halts in an area where there are few or no civilians. If this is impossible, all personnel are warned to keep civilians away from the

area or not to allow them to enter until they are screened

b. Battalion Outpost. An engineer unit seldom goes into the assembly area as a battalion size unit; but when it does, it posts outguards to provide security. Ordinarily, responsibility for these outguards is assigned to specific units occupying designated portions of the battalion perimeter.

c. Company and Platoon Outposts. An engineer company operating alone occupies a perimeter for security. Local security is provided by the platoons occupying the perimeter and establishing outpost systems in front of their positions.

67. Convoy Security Detachments

a. Lone vehicles and convoys which are not capable of providing their own security are grouped and escorted through danger areas by armed security detachments. These detachments are specially organized and trained to protect convoys from hostile guerrilla

Figure 37. Armor passing through a minefield.

actions; and they may contain elements of armor, infantry, and engineers. The size and composition of a detachment vary with the topography, the capabilities of hostile guerrilla forces, and the size and composition of the convoy. Traffic through known danger areas is normally controlled by traffic control stations.

b. The engineer element is placed well forward in the column to perform such engineer tasks as minor bridge and road repair, obstacle removal, and detection and removal of mines (fig. 37).

68. Unescorted Convoy Operations

When the armored division engineer battalion is not escorted through a danger area by a convoy security detachment, it organizes its own convoy security. Part of the available troops are placed well forward in the convoy; and a strong detachment is placed in vehicles that follow the main body. Radio contact is established between the two groups if possible. Speed is essential. Defiles are traversed at high speed. Sharp curves, steep grades, or other areas where low speed is necessary, are reconnoitered by foot troops. At the first indication of ambush, while the convoy is in motion, leading vehicles increase their speed if the road appears clear. In this effort to run through the ambush area, they go as fast as it is safe to drive. Drivers or assistant drivers of vehicles disabled by enemy fire or mines seek to direct their vehicles to the sides or off the roads so as not to block rear vehicles. Troops from vehicles stopped in the ambush area dismount and return fire, using all weapons. Troops from vehicles breaking through the ambush dismount and attack back against a flank of the ambush position. The rear

guard of the convoy, upon learning that the main body has been ambushed, dismounts and attacks forward against the other flank of the ambush position. If the enemy allows the main convoy to pass through and then ambush the rear guard, troops from the main body return and relieve the rear guard by an attack against the flank of the ambush position.

69. At Worksites

a. The amount of security the engineer commander furnishes at the worksite depends on the engineer mission, guerrilla activity in the area, the terrain, and the nearness of the enemy. For larger tasks, such as the engineer battalion constructing a road, the armored division usually provides the security forces. For smaller tasks, such as a company or platoon constructing a bridge, the officer or noncommissioned officer in charge of the construction project provides security with personnel from his unit when security forces are not provided by the supported unit.

b. In forward areas of the combat zone, the principal types of enemy action which the working parties take security measures against are dismounted patrols, motor or mechanized raids, and air attacks. Near the rear of the zone, there is less danger of enemy ground action, except guerrilla attacks. Air attacks may occur anywhere in a theater.

c. Enemy ground action can usually be guarded against by careful observation and by small security detachments covering probable avenues of approach (fig. 38). These may be supplemented by readily removable roadblocks, portable wire obstacles, and mines. The engineer officer or noncommissioned officer in charge of the worksite withdraws as few men

as possible from work to use for security. However, working parties are always prepared for possible ground raids. They keep their arms close at hand; and they are trained to assemble, with their weapons, under cover when they receive the warning.

Figure 38. Tank in dugout position.

d. The engineer officer or noncommissioned officer in charge of working parties prepares for security against air attack by training the parties in warning, concealment, dispersion, and fire. He trains the men to identify friendly and enemy aircraft. He posts guards at points of vantage; and he disperses and conceals equipment and vehicles which are not being used. He makes maximum use of the combat engineer vehicles and the personnel carriers, with their vehicular-mounted weapons, to provide the security. When the size of the party and the size of the jobs justify it, the officer or noncommissioned officer in charge of the worksite has machineguns emplaced so that they can be manned and used against low-flying aircraft. For

protection against air attack on a major rear-area project, the engineer officer requests air defense artillery through channels.

e. Local security for ADM operations is that protection which secures an area of ADM operations against concerted and organized hostile efforts that could affect the success of the mission. When hostile forces are present, local security will be required at least in the area within small arms range of the munition. Since the engineer delivery unit will rarely be able to establish local security, responsibility for local security should be assigned by the division to the tactical commander within whose area the mission is being conducted. Normally, this will be the commander of a combat command. The commander of local security forces will have the associated responsibility of warning and evacuating friendly forces and civilians. He will also keep withdrawal routes open for the ADM firing party. Actions of the tactical local security forces will be governed by "Orders to the Commander, Demolition Guard." The delivery unit and the local tactical security unit should establish early and effective liaison. The responsible common headquarters should explicitly delineate the respective responsibilities of the two units to insure that no interference exists with either the technical operations of the firing party or the prescribed system of command control of the ADM. In some instances, local security has to be provided by an allied force.

70. Against Guerrilla Forces

Guerrilla bands usually employ offensive tactics characterized by surprise, mobility, deception, and decentralized operations (FM 31–15). The armored

division engineer battalion commander insures that all engineer units are briefed on the fighting techniques of suspected guerrilla forces. The precautions and countermeasures which the engineer units use against guerrillas vary with the nature of the threat. At halts, and in assembly areas, guards are posted at all times including periods of rest and recreation. Groups of local inhabitants of any considerable size are not allowed near the assembly area. Local civilians are subjected to rigid security checks before they are allowed to work in engineer installations such as supply points and maintenance shops. Working parties observe security precautions while they are working, resting, and eating, and when they are going to and from the jobs. When a party leaves a task to return to camp, it takes with it all tools, transportation, and readily removable equipment. A party returning to an incompleted task is alert for ambushes and booby-traps; and it gives special attention to the security of arms, ammunition, and other equipment of value to the guerrillas.

71. Against Chemical and Biological Agents

a. Chemical Warfare. The armored division engineer battalion commander is responsible for the security of the battalion and its components against chemical attacks. He establishes a warning service, provides individual gas masks, and arranges for decontaminating equipment and supplies. Sentries are posted upwind to provide warning service, and men work with gas masks close at hand. Noncommissioned officers, using simple procedures and instruments available to the engineer unit, locate and mark contaminated areas after an attack.

b. Biological Warfare. The threat of biological warfare imposes upon all commanders within the division the responsibility for protection of personnel from the effects of this form of attack. Definite information of the employment of biological warfare will probably be disseminated from the armored division headquarters; but all echelons must be alert to the danger and must promptly report the incidence of unusual diseases. The best local defense against biological warfare is strict enforcement of all preventive medicine measures.

72. Against Nuclear Weapons

Nuclear warfare increases the amount of engineer effort required by armor. It also increases the importance of camouflage. The increased distances between units created by nuclear-defense dispersion will increase the employment of barriers. Distances between units necessitate strict enforcement of security measures. The best protection for individuals is the long-standing military practice of digging in. Field fortifications and shelters built according to present design, with added emphasis on overhead cover, provide good protection against other than direct hits and near misses. In addition to the measures available to the individual, the engineer commander must initiate collective defensive measures. Items considered under this heading include alarm systems, unit equipment used for protection or detection, unit decontamination system, and evacuation procedures. Tactical protection is concerned with the measures which the commander employs to minimize the effects of nuclear explosions. Within the limits of his assigned mission, he will rely on manuever, reconnaissance, and intelli-

gence. Whereas the individual soldier seeks to make his foxhole as secure as possible during his stay in an area, the unit commander must realize that through maneuver he may minimize the vulnerability of his unit to a nuclear attack.

Section VI. ARMORED INFANTRY TYPE COMBAT

73. Employment of Engineers

a. In carrying out their missions, armored division engineers frequently become involved in armored infantry type combat. They may fight to provide their own security while on the march, in assembly areas, or at worksites. In emergencies, armored engineers may be relieved of their engineer missions and assigned an armored infantry type combat mission. Such employment is ordered by a commander only after the most serious consideration of the effect upon the command as a whole, and the organization staff engineer must advise the commander as to the effect that stopping engineer work will have on the mission of the supported unit.

b. The basic tactics of engineers engaged in combat are those of armored infantry (FM 17–20). Armored division engineer units have less combat effectiveness than infantry units of similar size because their equipment and available supporting weapons are fewer, and their infantry combat training is not as extensive. To compensate in part for these disadvantages, armored engineer units are assigned smaller frontages than armored infantry units of corresponding sizes, and should be provided with fire support from heavy infantry weapons. To insure coordination of supporting fires, armored engineer units are usually attached to larger armored organizations.

c. Some of the situations where the major force commander may commit an armored engineer unit to a combat role are—

(1) An over-extended defensive area.
(2) A sudden enemy penetration or envelopment.
(3) An enemy airdrop, or an organized guerrilla activity in a rear area.
(4) A need to relieve a combat force that is about to be committed to a more decisive combat role elsewhere.

74. Preparation for Combat

a. Deployment.

(1) When armored engineer units are given an armored infantry type mission, they must be prepared to deploy with the minimum amount of delay. The proper type of support (such as artillery and mortar fires) must be coordinated. Nonessential personnel and items of equipment must be moved to an area where they will not be captured or destroyed by the enemy.
(2) If there is little or no warning given, the mission is usually a security rather than a combat mission. If it becomes necessary for the engineer commander to immediately engage the enemy, he should commit his unit in such a way as to stop or slow the enemy advance and then reorganize as necessary.
(3) When ample warning time is available to the engineer commander, he prepares his unit for combat in much the same manner as any combat force commander. He makes a tactical estimate of the situation and after

coordinating with adjacent units, fire support units, and other supporting units, issues his tactical operation order.

b. Engineer Missions. When the armored engineer battalion is committed in a combat role, engineer capabilities are greatly curtailed. Engineer supply and maintenance, map supply, water supply, and limited engineer reconnaissance are continued.

c. Modification of Normal Organization.

(1) Modification of the organization of the armored engineer battalion for armored infantry type combat is normally limited to headquarters company and armored engineer companies. The bridge company usually is not committed to this type of role. It remains intact, subject to call by the division engineer, for assignment to division engineer missions.

(2) When modified for combat, the armored engineer company is capable of furnishing command, combat, and crew-served-weapons elements. Normal organization is changed to provide effective use and control of crew-served-weapons, for security of equipment not needed for combat, and for the special requirements of command, communication, and supply in combat.

(3) The extent of modification for combat varies with the size of the unit, the time available, and the mission. When armored engineers are deliberately committed to infantry type combat, there is usually time to make the necessary initial changes before meeting the enemy. For an infantry type combat role, headquarters company and the armored

engineer companies are organized into forward and rear echelons (fig. 39).

(*a*) *Forward echelon.* The forward echelon consists of enough sections and units to include personnel and equipment to accomplish the armored infantry type combat mission.

(*b*) *Rear echelon.* The rear echelon includes all of the equipment and personnel not directly essential to the combat mission. Overhead personnel and such items as nonessential vehicles and heavy equipment move to a rear area designated by the commander. The number of personnel assigned is the minimum necessary to maintain the mobility of the rear echelon, provide for its local security, and perform essential administrative and service functions.

75. Firepower Support

a. Effective use of armored engineer units in an armored infantry type combat role can be increased with additional firepower furnished by other units within the armored division. Fire support is best accomplished when the armored engineer battalion is attached to a combat command and employed as a part of that organization. The combat command is then responsible for furnishing support fires. Forward observers from artillery and mortar units join the engineer units employed on the forward edge of the battle area.

b. If the battalion is committed as a unit, the combat engineer vehicles from all the platoons can be grouped

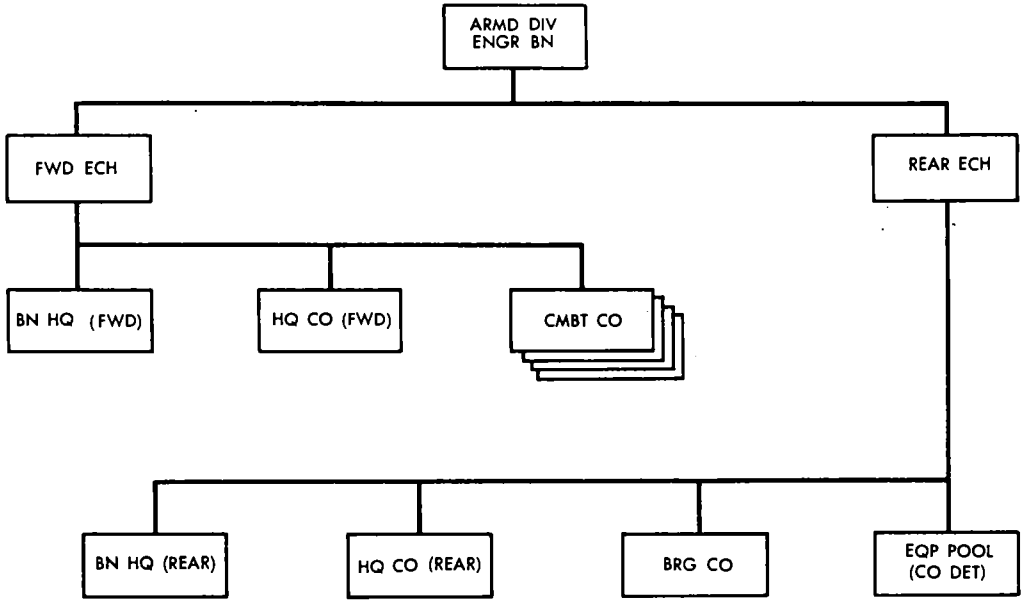


Figure 39. Typical modification of the armored division engineer battalion for armored infantry type combat.

into a reserve to provide antitank protection, or to be employed as directed by the battalion commander. One of the reconnaissance officers can be appointed leader of this force. If the battalion does not group the armored engineer vehicles at battalion level, the line company can do so with the three platoon armored vehicles, and place them under the command of the company executive officer.

76. Communications

The engineer unit enters the radio net of the organization to which attached. The use of prearranged signals is coordinated. In static situations, wire communication may be established. In addition, the use of messengers and sound and visual signals is necessary. Whenever possible, supporting artillery units should continue their wire net down to each deployed engineer company. Details of signal communication in the armored division are found in FM 17–70.

77. Suggested Guide for Modification of Organization

a. Commitment Plan. Commitment of an armored engineer unit to a prolonged combat role is not spontaneous. A definite plan, a part of the unit's SOP, must be established which will enable the unit to move efficiently from the normal engineer role to a combat role. It would be impossible to establish a definite armored infantry type combat plan for all armored engineer units. Each unit has its own characteristics, and each unit has progressed to a state of efficiency peculiar to itself. Because of this, only guidance can be suggested which an armored engineer commander can follow in preparing for a combat role.

b. *Headquarters and Headquarters Company* (fig. 40).

(1) *Battalion headquarters.*

(a) *Forward echelon.* The forward echelon of battalion headquarters is under the immediate control of the battalion commander. It operates the battalion command post, providing the staff agencies necessary for the conduct of tactical operations.

(b) *Rear echelon.* Members and equipment of the battalion staff sections which are not required for the forward echelon become part of the rear echelon. The battalion rear echelon is commanded by the senior officer present, usually the S4 officer.

(2) *Headquarters company.*

(a) *Forward echelon.* The forward echelon of headquarters company consists of the personnel and equipment of battalion headquarters necessary to establish, operate, and defend the battalion command post. It is commanded by the company commander.

(b) *Rear echelon.* The rear echelon is composed of personnel and equipment not required in the forward echelon. Available personnel and equipment of the company may be detached and used by the division engineer on engineer tasks elsewhere.

c. *Armored Engineer Companies* (fig. 41).

(1) *Forward echelon.* Personnel and equipment necessary to provide firepower, maneuver, and shock action elements to find, fix, and

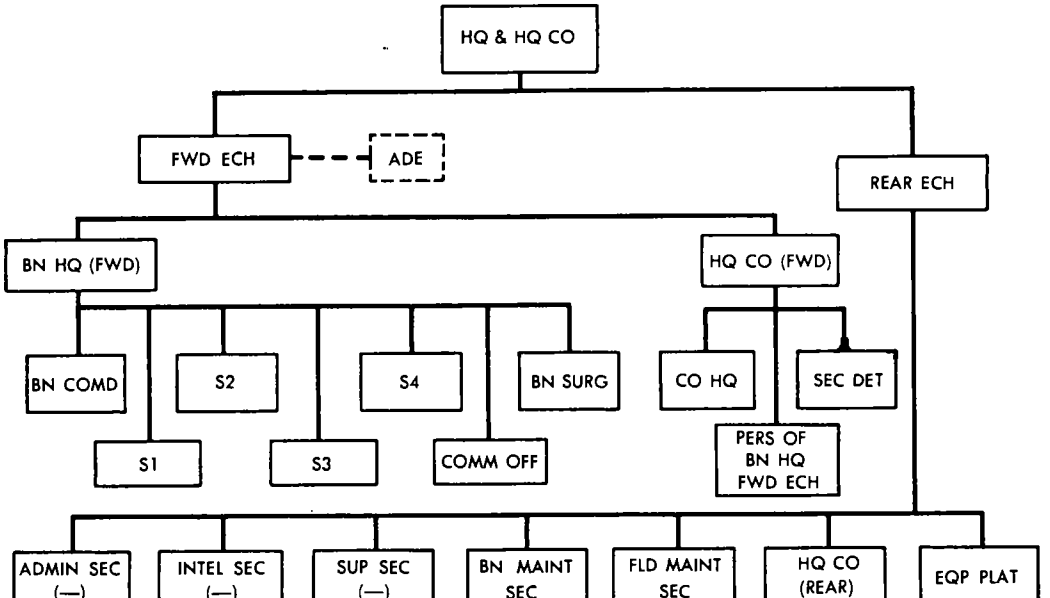


Figure 40. Typical modification of headquarters company, armored division engineer battalion, for armored infantry type combat.

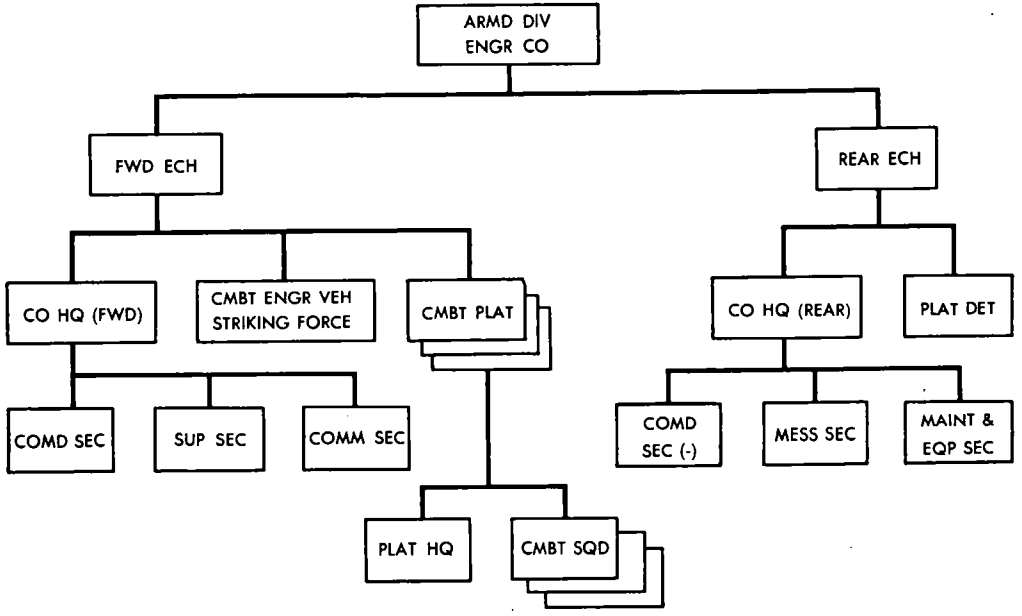


Figure 41. Typical modification of an armored engineer company for armored infantry type combat.

destroy the enemy, plus communication, supply, and command elements are formed into a forward echelon. Armored engineer companies are modified so that each will have a headquarters and three combat platoons, and if desired, a combat engineer vehicle striking force.

(2) *Rear echelon.* The rear echelon includes all personnel and equipment not directly essential to the combat role and moves to a rear area designated by the commander, or it may be grouped with the battalion rear echelon. The mission of the rear echelon is to support the company's operation and to provide its own security.

d. Bridge Company. The bridge company is not normally committed in an armored infantry type combat role. When the battalion is committed, the bridge company normally moves to the rear and becomes a part of the battalion rear echelon and assists in providing part of the security element for that area. The division engineer may assign some essential engineer tasks to the bridge company.

APPENDIX I
REFERENCES

1. DA Pamphlets

DA Pam 20–21	The Army School Catalog
108–1	Index of Army Motion Pictures, Film Strips, and Phono Recordings.
310-series	pertaining to administration, training, maintenance, and supply.
750–1	Preventive Maintenance Guide for Commanders.

2. Army Regulations and Special Regulations

AR 65–75	Unit Mail Service
220–60	Battalions, Battle Groups, Squadrons; General Provisions.
220–70	Companies; General Provisions
320–5	Dictionary of United States Army Terms.
320–50	Authorized Abbreviations and Brevity Codes.
350–1	Army Training Policies
611–201	Manual of Enlisted Military Occupational Specialties.
700–38	Unsatisfactory Equipment Report
711–16	Installation Stock Control and Supply Procedures.

AR 735–35	Property Accountability—Supply Procedures for TOE Units, Organizations, and Non-TOE Activities.
750–8	Command Maintenance Inspections.
SR 605–105–5	Commissioned and Warrant Officer Personnel Military Occupational Specialties.

3. Field Manuals

FM 5–15	Field Fortifications
5–20	Camouflage, Basic Principles and Field Camouflage.
5–25	Explosives and Demolitions
5–26	Employment of Atomic Demolition Munitions (U).
5–30	Engineer Intelligence
5–36	Route Reconnaissance and Classification.
7–10	Rifle Company, Infantry and Airborne Division Battle Groups.
7–40	Infantry and Airborne Division Battle Groups.
17–1	Armor Operations—Small Units
17–20	Armored Infantry Units; Platoon, Company, and Battalion.
17–33	Tank Units; Platoon, Company, and Battalion.
17–50	Armor Logistics
17–70	Communication for Armor Units
17–95	The Armored Cavalry Regiment
17–100	The Armored Division and Combat Command.

FM 20–32	Land Mine Warfare
21–5	Military Training
21–6	Techniques of Military Instruction.
21–10	Military Sanitation
21–30	Military Symbols
21–40	Small Unit Procedures in Nuclear Biological, and Chemical Warfare.
21–41	Soldier's Handbook for Nuclear, Biological, and Chemical Warfare.
21–48	Training Exercises and Integrated Training in Chemical, Biological, and Nuclear Warfare.
21–60	Visual Signals
24–18	Field Radio Techniques
24–20	Field Wire and Field Cable Techniques.
30–5	Combat Intelligence
30–10	Terrain Intelligence
30–16	Technical Intelligence (U)
31–10	Barriers and Denial Operations
31–15	Operations Against Airborne Attack, Guerrilla Action, and Infiltration.
31–50	Combat in Fortified Areas and Towns.
31–60	River Crossing Operations
100–5	Field Service Regulations—Operations.
100–10	Field Service Regulations; Administration.

FM 101–5	Staff Officers' Field Manual; Staff Organization and Procedure.
101–10	Staff Officers' Field Manual; Technical and Logistical Data.

4. Technical Manuals

TM 5–210	Military Floating Bridge Equipment.
5–250	Roads and Airfields
5–251	Army Airfields and Heliports
5–252	Use of Road and Airfield Construction Equipment.
5–285	Semipermanent Highway Steel Bridges, 30- 60-, and 90-Foot Spans.
5–286	Semipermanent Highway and Railway Trestle Bridges.
5–295	Military Water Supply
5–302	Construction in the Theater of Operations.
5–505	Maintenance of Engineer Equipment.
5–4610–204–10	Operator's Manual—Water Purification Unit, Van Type Body Mounted, Electric Driven, AC 115 and 208 Volt, Single and 3 Phase, 60 Cycle, 1/70 to 2 HP, 1500 GPH (Met-pro Model 1500–2600) FSN 4610–649–8386.
9–1100	Inspection of Ordnance Materiel in the Hands of Troops.
9–1870–1	Care and Maintenance of Pneumatic Tires.

TM 9–2810	Preventive Maintenance—Tactical Motor Vehicles.
21–300	Driver Training and Selection (Wheeled Vehicles).

5. Training Circulars

TC 5–2	Employment of Mobile Assault Bridging.
101–1	Prediction of Fallout and Radiological Monitoring and Survey.

6. Army Training Programs

ATP 5–5	Engineer Combat Units

APPENDIX II
RECOMMENDED OUTLINE FOR AN SOP

Standing Operating Procedure—Armored Division Engineer Battalion

Hq, Engr Bn (Armd Div)
APO _____, U.S. Army
1 July 19____

Section 1. GENERAL

1. APPLICATION (to operations, relation to prior SOP's, lower units to conform)
2. PURPOSE
3. REFERENCES (AR's, SR's, FM's, and TM's)—Annex A.
4. RESPONSIBILITY FOR SOP (preparation, changes, and revisions).
5. EFFECTIVE DATE

Section II. COMMAND, STAFF, AND LIAISON

6. ORGANIZATION
   a. Normal.
   b. Special Internal Attachments and Organization.
   c. Normal and Special, External Attachment and Support (combat commands, task forces, etc.).
7. COMAND POSTS
   a. Normal Location (in relation to next higher headquarters).

b. Reporting Change of Location (coordinates and time).

c. Forward CP's.

(1) When (situation for which required).

(2) How (organized).

(3) Personnel and equipment.

8. STAFF DUTIES

a. Duties That Are Special or Additional to Those in FM's 5–134 and 101–5.

b. Duties of Such Other Important Special Staff Officers as the Commander Desires To Prescribe (paragraph for each).

9. LIAISON (FM's 5–134 and 101–5)

a. Duties of Liaison Officers.

b. Responsibilities of Liaison (with next higher, lower, and adjacent units).

Section III. ADMINISTRATION

10. GENERAL (Channels) (FM 100–10)

11. REPORTS

a. Routine.

b. Special.

c. Information Concerning Submission of Reports. Annex B.

(1) Title and reports control symbol.

(2) Form of report.

(3) Date due.

(4) Number of copies.

(5) Negative report required or permissible.

12. PROMOTIONS (policies)

a. Officer (AR's and SR's in 140- and 605-series).

b. Enlisted (AR 624–200).

c. Battlefield.

13. COURTS-MARTIAL (MCM, US 1951)
   a. Local Jurisdiction.
   b. Procedure for Submitting Charges.
14. MAIL (AR 340–15, 341–10, and 341–50)
   a. Handling Official Mail.
   b. Handling Personal Mail.
15. LEAVES AND PASSES (AR's 630–5, 630–10, 639–20).
   a. Policy of Command (frequency, conduct, VD policies, etc.).
   b. Authority To Grant.
16. JOURNALS AND HISTORY (AR's 220–345, 220–346, SR 600–730–5).
   a. Responsibility for Unit Journal and History.
   b. Maintenance of Staff-Section Journals.
17. DISTRIBUTION OF MILITARY PUBLICATIONS (AR 310–1).
18. HANDLING PRISONERS OF WAR (DA Pam 20–151).
   a. Reference to FM 27–10.
   b. Special Instruction for Capturing Units.
19. AWARDS AND DECORATIONS (AR's 220–105 and 762–5–1)
   a. Channels.
   b. Forms.
   c. Presentations.
20. ORDERS (FM 101–5)
   a. Combat Orders.
   b. Memoranda of Combat Orders to S3.
21. BILLETS AND ASSEMBLY AREAS
   a. Billeting Policies (occupation and vacating).
   b. Billeting Party (organization and duties).

Section IV. RECONNAISSANCE, INTELLIGENCE, AND COUNTERINTELLIGENCE

22. RECONNAISSANCE
   - *a.* Reconnaissance a Continuing Function.
   - *b.* Essential Elements of Engineer Information.

23. ENGINEER INTELLIGENCE (FM 5–30)
   - *a.* Evaluation.
   - *b.* Preparation of Reports.
   - *c.* Dissemination.

24. COMBAT INTELLIGENCE (FM 30–5)
   - *a.* Definition of "Spot Report."
   - *b.* "Spot Reports" Required.
     - (1) Initial contact with enemy.
     - (2) Marked changes in enemy disposition or situation
     - (3) Attack by armored, aircraft, or airborne forces.
     - (4) New units identified.
     - (5) Enemy strength, composition, and movement.
     - (6) Location of enemy installations.
     - (7) Use of chemicals or new weapons.
     - (8) New enemy materials or equipment.

25. COUNTERINTELLIGENCE
   - *a.* Mail Censorship.
   - *b.* Blackout Discipline.
   - *c.* Extent of Information Given, if Captured.
   - *d.* Signs and Countersigns.
   - *e.* Destruction of Classified Material.
   - *f.* Civilian Control.
   - *g.* Secrecy Discipline.
   - *h.* Information to Press Representatives.

Section V. OPERATIONS

26. ORDERS (FM 101–5)
   a. Fragmentary Orders.
   b. Written Orders.
   c. Use of Overlays, Tables, and Charts.

27. SECURITY—Annex C
   a. Responsibilities of Battalion in Rear Area.
   b. Responsibilities of Unit Commander.

28. COMBAT
   a. Modification for Armored Infantry Type Combat, Annex D.
   b. Responsibility for Contact.
   c. Coordination of Request for Fire Support and Tactical Air Support.
   d. Spot Reports.
   e. Situation Reports.
   f. Minefields.
   g. CBR Warfare. Annex E.
      (1) Defensive.
      (2) Offensive.
   h. Smoke.
      (1) Request for use.
      (2) Coordination.
   i. Defense Against Air Attack.
   j. Employment of ADM. Annex F.
   k. Bomb and Shell Disposal.

29. MOVEMENT
   a. General.
      (1) What constitutes a convoy.
      (2) Required road clearances.
      (3) Requests for augmented transportation.
      (4) Loading plan. Annex G.

b. General Responsibilities.

(1) S–1.

(*a*) Coordination with civil and military police.

(*b*) Commands quartering party.

(2) S–2.

(*a*) Security of bivouac and halt areas.

(*b*) Reconnaissance of route.

(*c*) Posting of road guides.

(3) S–3.

(*a*) Warning order.

(*b*) Movement order.

(*c*) Selects routes.

(*d*) Arranges for road clearances.

(4) S–4.

(*a*) Arranges for augmented transportation.

(*b*) Responsible for traffic planning.

(5) Motor officer.

Responsible for maintenance.

(6) Company commander.

(*a*) Prepares company loading plan.

(*b*) Furnishes S–3 with lists of vehicles, equipment, and materials.

(*c*) Conducts necessary training for movement.

(*d*) Polices area.

c. Motor Movement. Annex H.

d. Rail Movement. Annex I.

e. Alert Plans.

(1) Unit plans.

(2) Alert rosters.

Section VI. LOGISTICS

30. CLASS I SUPPLY

a. Ration Pickup.

b. Daily Ration Return and Ration Cycle.

c. Reserve Rations Carried.
  (1) By unit.
  (2) By individual.
d. Responsibility for Attached Units.

31. WATER SUPPLY
a. Authorized Sources.
b. Purification by Expedient Methods.
c. Water Economy.

32. CLASS II AND CLASS IV SUPPLY
a. Requisition Days for Various Services.
b. Pickup Procedure.
c. Salvage Turn-in Procedure.
d. Droppage by "Battle Loss Certificate."
e. Basic Loads. Annex J.

33. CLASS III SUPPLY
a. Method of Supply.
b. Fuel Sources.

34. CLASS V SUPPLY
a. Method of Requisitioning.
b. Forms Used and Certificates Required.
c. Basic Load. Annex J.
d. Salvage.

35. MAINTENANCE OF VEHICLES AND EQUIPMENT (TM's 5–505, 9–2810, and 38–660–1).
a. Echelons of Maintenance.
b. Maintenance Officer's Responsibilities.
c. Forms Used.
d. Priorities.

36. REPAIR PARTS
a. Method of Requisitioning Engineer and Ordnance.
b. Maintenance of Stock Levels.
c. Inspections for Maintenance and Stock Levels.
d. Parts and Equipment Records.

37. EVACUATION OF VEHICLES AND EQUIPMENT.
   a. Engineer Channels.
   b. Ordnance Channels.
38. PURCHASE AND PROCUREMENT (AR's 700–34 and 37–107).
   a. Designation and Duties of P&C Officer.
   b. Procedures and Channels.
   c. Items and Services (include real estate).
39. EVACUATION AND HOSPITALIZATION—Annex K.

Section VII. COMMUNICATION

40. COMMUNICATION BETWEEN UNITS
   a. Radio (FM 24–18). Annex L.
   b. Wire (FM 24–20). Annex M.
   c. Responsibility for Installation.
   d. Visual (FM 21–60).
41. COMMUNICATION PROCEDURES
   a. Radiotelephone Voice Procedure (FM's 24–18 and 24–20).
   b. Signal Security.
   c. Citation of SOI and SSI of Higher Headquarters.
42. MAINTENANCE RESPONSIBILITIES OF COMMUNICATION OFFICER (FM's 100–11, 17–50, and 17–70).

GREEN
Lt Col

Annex: A—References (omitted)
B—Reports (omitted)
C—Security
D—Modification for Armored Infantry Type Combat.

E—CBR Warfare
F—Employment of ADM
G—Loading Plan (omitted)
H—Motor Movement
I—Rail Movement
J—Basic Loads (omitted)
K—Evacuation and Hospitalization (omitted)
L—Radio Communication Nets (omitted)
M—Wire Communication Nets (omitted)

OFFICIAL:
/s/ Black
BLACK
Adj

ANNEX C (SECURITY) TO SOP, HQ, ---------- ENGINEER BATTALION, ARMORED DIVISION.

1. GENERAL SECURITY

Policy and Responsibilities (FM 26–5 and AR's 245–15 and 380–5).

2. SECURITY DURING MOVEMENT

a. Air Guards.
b. Manning of Vehicular Weapons.
c. Camouflage During Halts.
d. Advance, Flank, and Rear Guards.
e. Action in Case of Attack.
  (1) Air.
  (2) Mechanized.
  (3) Nuclear, biological, and chemical.

3. SECURITY IN ASSEMBLY AREA (FM's 5–15, 5–20, 5–31, 17–100, and 31–21).

a. Camouflage.
b. Mines and Boobytraps.
c. Placement of Weapons.
  (1) Air attack.
  (2) Mechanized.
  (3) Nuclear, biological, and chemical.
d. Joint Security.
e. Security Plans.
f. Sentry Posts and Outposts.

4. REAR-AREA OBSERVATION (FM's 7–10 and 7–40).

a. Formation of Rear-Area Observation Groups.
b. Selection of Rear-Area Observation Posts.
c. Twenty-Four-Hour Manning Posts.
d. Observation of Rear Areas When Required.
e. Communications for Observation Posts.

5. SECURITY OF WORKING PARTIES
   a. Responsibility.
   b. Camouflage of Equipment.
   c. Combat Readiness.
6. SECURITY WARNING SIGNALS
   a. Air Attack.
   b. Airborne Attack.
   c. Mechanized Attack.
   d. Gas Attack.
   e. Nuclear, Biological, and Chemical Attack.
7. FIRE SAFETY AND FIREFIGHTING (AR 420–90).
   a. Plan (general).
   b. Fire Personnel and Duties.
   c. Safety Rules (motor pools, kitchens, and so forth).
8. ALERT PLANS
   a. Unit Plans.
   b. Alert Roster.

ANNEX D (MODIFICATION FOR ARMORED INFANTRY TYPE COMBAT) TO SOP, HQ, ---------- ENGINEER BATTALION, ARMORED DIVISION

1. GENERAL
   a. Requirement.
   b. Prior Approval of the Battalion Commander.
2. DESIGNATION OF FORWARD ECHELON
   a. Personnel.
   b. Equipment.
3. DESIGNATION OF REAR ECHELON
   a. Personnel.
   b. Equipment.
4. SUPPLY
   a. Ammunition.
   b. Unit Trains.
5. COMMUNICATION
6. MEDICAL EVACUATION (FM's 7–21, 17–100, and 8–35).
7. STATEMENT OF EFFECT ON REGULAR MISSION.

ANNEX E (CBR WARFARE) TO SOP,
HQ, _____ ENGINEER BATTALION,
ARMORED DIVISION

1. GENERAL
   a. Purpose.
   b. Subordinate Units To Issue SOP's To Conform.

2. REFERENCES
   a. FM 21–40 (other pertinent doctrinal sources).
   b. Division Training Directive No. _____.
   c. Orders, SOP's and Annexes.

3. ORGANIZATION
   a. Command Staff Structure.
   b. Specialists.

4. RESPONSIBILITIES
   a. Individual.
   b. Company Commanders.
      (1) Plans.
      (2) Proficiency of unit personnel.
      (3) Safeguarding and processing of captured enemy CBR personnel and equipment.
      (4) Unit CBR equipment.
      (5) First and second echelon decontamination.
   c. Large-Scale Decontamination (see Engineer Annex, Armd Div SOP No. _____).

5. DISPERSION
   Guide to Minimum Yardage Maintained Between Various Type Sections.

6. CBR ALARMS
   a. General Alarm. Attack Considered Imminent.
   b. Actual Attack.
   c. All Clear.

7. PROCEDURE IN CASE OF CBR ATTACK
   a. Action Prior to Attack.
   b. Action During Attack.
      (1) Protective equipment.
      (2) Cover and movement.
      (3) Unit protective measures.
      (4) Coordination between higher, lower, and adjacent units.
   c. Action After Attack.
      (1) All-clear signal.
      (2) Continuation of mission.
      (3) Resupply of protective equipment and material.
      (4) Marking and reporting of contaminated areas.
      (5) Decontamination.

8. PROTECTION
   a. Individual.
   b. Unit.
   c. Tactical.

9. SUPPLY
   a. Emergency Requisitions.
   b. Authorized Levels of CBR Equipment.

10. TRAINING
   See Division Training Directive No. _____.

ANNEX F (EMPLOYMENT OF ADM) TO SOP, HQ, ---------- ENGINEER BATTALION, ARMORED DIVISION

1. PUBLICATIONS

a. Listing. An annex or appendix should include those TM's, FM's, ordnance technical information letters, etc., deemed necessary for the assemblymen to scan, read, or study. This listing, however, should not act as a substitution for the complete statement of policy within the SOP.

b. Responsibility.

(1) Preparation and review of local SOP's.
(2) Requisition of pertinent publications.
(3) Posting of all changes.
(4) Storage of materiel (see also under security).

c. Requisitioning Procedure.

d. Unsatisfactory Reports (UR) (TM 39–5–8).

(1) Preparation.
(2) Submission.
(3) Recording file.

2. SECURITY

a. Statement of Policy.

(1) Importance.
(2) Possible consequences of violations.
(3) Responsibilities.

b. Document Control Procedure.

c. Training Item Control.

d. Classified Study Procedure.

e. Clearances. An annex or appendix should include the clearance of officers and their enlisted men.

f. Access List. An annex or appendix should include the current access list to the exclusion area.

3. SAFETY

a. General Safety Procedures.

(1) A statement allowing no deviation from the standard checklist as prepared by battalion, division, or army, dependent on theater policy.

(2) Applicable safety requirements deemed necessary, such as preventive maintenance, driver training, preoperation checks, etc.

b. Electrical Safety Requirements (if desired).

c. Explosive Safety Requirements (TM 39-20-1).

d. Nuclear Safety Requirements (TM 39-20-3).

e. Placement Equipment Load Tests and Records of Tests.

4. TRANSPORTATION

a. Convoy Composition. Allow for three or four different types of composition. Do not attempt to standardize beyond minimum requirements.

b. Courier Officer.

(1) Clearance.

(2) Responsibility.

c. Convoy Officer (ranking man).

(1) Clearance.

(2) Responsibilities.

(3) May also be courier officer under most conditions (check with higher headquarters).

d. Drivers.

Responsibilities.

e. Guards.

(1) Escort guards (access to equipment).

(*a*) Clearance—equal to the classification of the equipment carried.

(*b*) Responsibility.

(2) Convoy guards (no access to equipment).
(a) Clearance—no special clearance required.
(b) Responsibility.
(c) Local security (infantry, armor, etc.).
(d) Standby reserve force.
(e) Radio requirements (communication).
(f) Air transport.

5. EMERGENCY DESTRUCTION OR DISPOSAL

a. Chain of Command (who can authorize destruction or disposal).

b. List of Materials Required for Destruction.

c. Priority of Destruction or Disposal.

d. Procedures.
(1) Nuclear components.
(2) Nonnuclear components.

6. STORAGE AND MAINTENANCE

a. Permanent Requirements (if applicable).

b. Temporary Storage Requirements.
(1) Physical storage.
(2) Security requirements (see also under security).

c. Schedule for Storage Inspection (SI) and Storage Monitoring (SM)—Ordnance Responsibility.

d. Schedule for Partial Storage Monitoring (PSM)—Unit Responsibility.

7. SUPPLY

a. Requisition Procedure.

b. Property Accountability.

c. Equipment Maintenance Records (when applicable).

8. TRAINING

a. Classified Training Requirements—ADM training should be conducted each week in the following type breakdown:

(1) Assembly procedures.
(This phase is entirely dependent upon the availability of training items).
(2) Field wire installation.
(3) Formal instruction (manual study, UR preparation, review of new material).
(4) Support training.
(*a*) Convoy procedure.
(*b*) Site preparation.
(*c*) Team organization.
(*d*) Review of the SOP.

b. Training records.

c. Testing Procedure (written, performance, IG, and/or ATT).

d. Security Training.

9. ORGANIZATION FOR ADM MISSIONS

Note. This paragraph outlines a suggested organization of the ADM firing party for the conduct of an ADM mission. Missions in support of allied forces will require modifications, particularly when the delivery unit is unable to provide all the personnel required for a normal firing party. For example, it may be necessary to utilize allied personnel on the support team.

a. Team Leaders (indicated by position rather than name; example: CO, XO, Plat Ldr, Plat Sgt, Sqd Ldr, etc.).

(1) ADM firing party commander.
(2) OIC or NCOIC of the assembly team.
(3) OIC or NCOIC of the support team.
(4) OIC or NCOIC of the security team.

b. Composition and Duties.

(1) Assembly team.
(*a*) Pickup of ADM equipment (an annex or appendix may be inserted listing personnel currently on the SASP access list and/or signature card file).

(*b*) Transportation (paragraph 4, this annex to SOP, outlines transportation procedures).

(*c*) Prefire procedures (an annex or appendix should be inserted which contains the prefire checklists).

(*d*) Remote command fire procedures.

(*e*) Basic immediate security of munition.

(2) Support team (dependent on type of mission).

(*a*) Pickup and transportation of all support material (mines, camouflage, tentage, etc.).

(*b*) Initial preparation of the emplacement site (installation, mines, wire boobytraps, etc.).

(*c*) Field wire command link installation (an annex or appendix should be inserted which contains the field wire installation checklist).

(*d*) Remote command site(s) preparation.

(3) Security team (dependent on terrain, tactical situation, etc.).

(*a*) Provide escort guards during the transportation phase.

(*b*) Establish emplacement site immediate security prior to the arrival of the emplacement team.

(*c*) Maintain emplacement site immediate security while establishing command site security.

(*d*) Provide immediate security detail at the completed emplacement site until prearranged departure time.

(*e*) Provide immediate security detail at the command site until after detonation.

10. INCIDENT PLANS

Note. This paragraph will cover such contingencies as accidents or delays, to include explosions, nuclear contamination, misfire, malfunction, and damage.

ANNEX H (MOTOR MOVEMENT) TO SOP, HQ, ---------- ENGINEER BATTALION, ARMORED DIVISION

1. GENERAL (FM 25–10, AR 55–355, and division SOP and march orders).
   a. Preparation of Vehicles.
   b. Motor Marches.
      (1) Strip maps.
      (2) Route reconnaissance.
      (3) Messing and refueling.
      (4) Night marches.
      (5) Composition of march units and serials.
      (6) Distances to be maintained.
      (7) Speeds and rate of march.
      (8) Posting of traffic guards during halts.
   c. Conduct of Personnel During Movement.
   d. Maintenance on Marches and Movements.

2. VEHICLE AND EQUIPMENT REGULATIONS
   a. Motor Pool (AR's 700–2300–1 and 58–5)
      (1) Dispatch.
      (2) Service.
      (3) Maintenance.
   b. Regulations for Administrative Vehicles.

ANNEX I (RAIL MOVEMENT) TO SOP,
HQ, _____ ENGINEER BATTALION,
ARMORED DIVISION

1. ACTION BY S1
   a. Movement Policy.
   b. Troop Lists.
   c. Designation of Movement Control Personnel.

2. ACTION BY S2
   a. Railroad Reconnaissance Report.
   b. Coordinate Loading Plans.
   c. Prepare Loading Schedule and Designate Areas.

3. ACTION BY S4
   a. Initiate Transportation Requests.
   b. Troop and Guard Mess.
   c. Procurement of Blocking Dunnage.
   d. Prepare Shipping Documents.

APPENDIX III

EXAMPLES OF ENGINEER ANNEXES TO AN ARMORED DIVISION OPERATION PLAN

EXAMPLE 1. ENGINEER ANNEX TO AN ARMORED DIVISION OPERATION PLAN.

(Not a Copy of Any Known Plan.)

(Classification)

(No change from verbal orders except paragraph 1*b*(3).)

Copy No. 5
4th Armored Division
TOWNVILLE (2484)
AGGRESSORLAND
251500 Jul 19____
AR 6543

Annex D (Engineer) to Operation Plan STORM
References: Maps, AGGRESSORLAND, 1:50,000, TOWNVILLE, FARMVILLE, DELTA, revised May 19 ____.

1. SITUATION

a. Enemy forces. Annex A (Intelligence) to OPLAN STORM.

(Classification)

(Classification)

b. Friendly forces.

(1) Annex B (Operations Overlay) to OPLAN STORM.

(2) Appendix 1 (Barrier Plan) to Annex B (Operations Overlay) to OPLAN STORM.

(3) Corps Arty furnishes AD protection to engineer equipment parks, bridge and ferry sites in zone.

(4) Corps engineer assumes responsibility for division engineer area and task assignments at effective time and date of execution of OPORD 13.

c. Attachments and detachments.

121st Engr Bn (C) attached effective 260400 Jul 19 ____.

d. Assumptions.

(1) Par. 1*d* OPLAN STORM.

(2) Terrain will initially require utilization of AVLB. During Phase 2 stream crossings will require rafting and float bridge equipment.

2. MISSION

Organic and attached engineer units support operation by breaching obstacles and minefields, maintaining roads in zone, and constructing bridges over streams and dry gaps.

3. EXECUTION

a. Concept of operations.

(1) Paragraph 3*a*, OPLAN STORM.

(Classification)

(2) Organic engineer units will provide support to committed combat commands with priority of support to CCB, CCA. Organic Bn (–) and attached Engr Bn (C) will provide general support on area basis, prepared to provide direct support to CCC when committed.

b. 4th Armd Engr Bn.

(1) Attach one Engr Co reinforced with one platoon bridge Co and one Sec AVLB to CCA.

(2) Attach one Engr Co reinforced with two Sec AVLB to CCB.

(3) Bn (–): GS.

(4) Be prepared to attach one Engr Co reinforced with two platoons bridge Co to CCC on order.

(5) Be prepared to establish a minimum of three WSP east of NARROW River.

c. 121st Engr Bn (C).

(1) Operate 3 WSP in zone.

(2) Maintain Div MSR.

(3) Be prepared to assist in construction of floating and/or fixed bridges on order.

(4) Be prepared to construct roadblocks east of DELTA (4188) on order.

d. Coordinating instructions.

(1) WSP will be leapfrogged to ensure continuous water supply.

(2) Direct liaison authorized between 4th Armd Div Engr and 1st and 2d Inf Div Engr.

(3) After opening bridges across NARROW River, maintain two rafts in operation at each bridge site for return traffic until 261800 Jul 19____.
(4) This plan effective for planning on receipt, becomes OPORD 13 for execution on Div order.

4. ADMINISTRATION AND LOGISTICS

a. ADMINO 5 remains in effect, except paragraph 1*b*.

b. Div Engr distribution point, HILLDALE (2618).

c. App 1—Allocation of Engr Cl I, II, and IV, Equip and Sup.

d. Location of Engr Equip parks as follows:
(1) No. 1—Vic HIGH RIDGE (2439).
(2) No. 2—LOW KNOB (2324).
(3) No. 3—FLAT LAND (2556).

5. COMMAND AND SIGNAL

a. Annex H (Signal) to OPLAN STORM; Index 9, SOI.

b. CP's:
(1) 4th Engr Bn (Armd Div), TOWN (4087).
(2) Other CP's report location.

c. Axis of signal communications. TOWN (4087)—VILLAGE (6389)—CITY (7843).

Acknowledge.

(Classification)

TANKER
Maj Gen

Appendixes: Appendix 1—Allocation of Engr Cl I, II, and IV Eqp and Sup (omitted)
Distribution: A
OFFICIAL:
/s/ Price
PRICE
G3

(Classification)

EXAMPLE 2. BARRIER ANNEX TO AN ARMORED DIVISION OPERATION PLAN.

(Not a Copy of Any Known Plan.)

(Classification)

(No change from verbal orders.)

Copy No. 3
4th Armored Division
BOBS (4098),
AGGRESSORLAND
181945 Feb 19____
AR 6767

Annex F (Barrier Plan) to Operation Plan LANCE
Task Organization: Annex A, Task Organization, to OPLAN LANCE.
References: Maps, AGGRESSORLAND, 1:100,000, ROTHEN, Edition 5; AGGRESSORLAND, 1:500,000, MERGEN, Edition 2.

1. SITUATION

a. Enemy forces. Annex A (Intelligence) to OPLAN LANCE.

b. Friendly forces.

(1) Paragraph 1*b*, OPLAN LANCE.

(2) 11th Engr Gp (C) supports 4th Armd Div with one Float Bridge Company on order.

c. Attachments and detachments.

111th Engr Bn (C) attached effective 181945 Feb 19____.

d. Assumptions.

(1) Paragraph 1*d*, OPLAN LANCE.

(Classification)

(2) Forward units will have a minimum of 24 hours to prepare barrier before receiving enemy pressure.

2. MISSION

Division, acting as corps covering force, executes barrier system and extends corps barrier in sector to disorganize, deceive, and delay the enemy in front of the GOPL, and to force concentration of enemy forces in the valleys of the UMP and WACH Rivers if RED River is crossed.

3. EXECUTION

a. Concept of operations.

(1) Paragraph 3*a*, OPLAN LANCE.

(2) Barrier system east of RED River designed to disorganize, deceive, and delay the enemy; barrier system west of RED River designed to force concentration of enemy forces in the valleys of the UMP and WACH Rivers.

b. CCA.

Barrier	Priority	Target date for completion	Remarks
BAL River	1	191945	Demolish all bridges on BAL River; crater, demolish, and mine with both AT and APers mines the approaches through ridge MESSEL (4810)—BRON (5107).

Barrier	Priority	Target date for completion	Remarks
E	1	191945	Crater and mine defile at ALT (4598) with AT and APers mines.
FK	2	211800	Mine saddle from WEIGER (4000) to JUNG (4007) with AT mines only.
HL	3	211800	Mine ridge UTTING (4299) to RJ at 425990 with AT mines only.

c. CCB.

Barrier	Priority	Target date for completion	Remarks
AB	1	200200	Mine entrance to UMP River Valley with both AT and APers mines; improve RED River banks to form effective obstacles; demolish bridges over RED River on Div order.
BD	2	210600	Prepare wire obstacles and mine ridge with AT mines; be prepared to reinforce with APers mines.
AE	3	211800	Mine UMP River Valley with both AT and APers mines.

(Classification)

d. CCC.

Barrier	Priority	Target date for completion	Remarks
BC	1	191945	Improve RED River banks to form effective obstacle and mine with both AT and APers mines; demolish all bridges over RED River on Div order.
DG	2	210600	Prepare wire obstacles and mine ridges D to G with AT mines only initially; be prepared to reinforce with APers mines.
GI	3	211800	Mine WACH Valley with both AT and APers mines.

e. 4th Engr Bn (Armd Div).

Barrier	Priority	Target date for completion	Remarks
JK	1	201945	Mine ridge with AT mines only initially; be prepared to reinforce with APers mines on order.
EJ	1	201945	Prepare for demolition all bridges over UMP River; mine with both AT and APers mines.

(Classification)

Barrier	Priority	Target date for completion	Remarks
IM	2	211800	Prepare for demolition all bridges over WACH; mine with both AT and APers mines.

f. 111th Engr Bn (C).

Barrier	Priority	Target date for completion	Remarks
KLM	1	201945	Mine ridge with AT mines only initially; be prepared to reinforce with APers mines on order.
IM	2	211800	Prepare for demolition all bridges over WACH; mine with both AT and APers mines.

g. Coordinating instructions.

(1) Combat Commands will prepare additional barriers forward of GOPL which block high speed avenues of approach and lateral barriers between adjacent combat commands.

(2) Combat Commands coordinate extent of and location of lanes and gaps with adjacent corps. Direct liaison is authorized.
(3) Provisions will be made to cover barriers with heavy weapons fire; small-arms fire coverage wherever possible.
(4) Gaps and lanes in minefields will remain open until ordered closed by Div Hq or until threat of capture by the enemy.
(5) Demolitions, including bridges and cratering of routes, executed only on order Div Hq or on combat command order if threat of capture by the enemy is imminent.
(6) Appendix 1, Barrier Overlay.
(7) Appendix 2, Minefield Location Plan.
(8) Appendix 3, Obstacles and Demolitions Plan.
(9) This barrier plan not taken forward of combat command CP.
(10) This plan effective for planning on receipt becomes OPORD 25 on Div order.

4. ADMINISTRATION AND LOGISTICS

a. ADMINO 18 continues in effect except paragraph 1*b*.

b. AT and APers mines, demolitions, and napalm available ASP 182100 Feb 19____.

c. Minefield marking materials, wire, and fortifications materials available Engr Sup Pt 182100 Feb 19____.

(Classification)

5. COMMAND AND SIGNAL

a. Signal. Index 3, SOI.

b. Reports.

(1) Minefields. Report intended location, extent, estimated time of completion, type and density of mines; follow with standard minefield laying report including sketches.

(2) Other obstacles and demolitions. Report location, type, extent, and estimated time of completion.

Acknowledge.

TANKER
Maj Gen

Appendixes: 1—Barrier Overlay (omitted)
2—Minefield Location Plan (omitted)
3—Obstacles and Demolitions Plan (omitted).
4—Allotment of C1 I, IV, and V Equipment and Supply (omitted).

Distribution: A
2d Corps
3d Corps

OFFICIAL:
/s/ Price
PRICE
G3

(Classification)

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[AG 353 (9 Dec 60)]

BY ORDER OF THE SECRETARY OF THE ARMY:

G. H. DECKER,
General, United States Army,
Chief of Staff.

Official:

R. V. LEE,
Major General, United States Army,
The Adjutant General.

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